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Railway Pay Claim Offer

AS we go to press, the position regarding the railway pay claim, although still fluid, is full of hope of a settlement. On May 13, a discussion between the British Transport Commission and the railway trade unions occupied several hours at B.T.C. headquarters. A last-minute decision to hold the talks at Marylebone and not, as originally planned, at the Ministry of Labour, was an indication of the goodwill continuing to exist between Commission and the unions. The immediate outcome of the meeting was the Commission's offer of a 3 per cent increase in railway wages and salaries to take effect from the pay week commencing June 30, 1958. This offer was made in the light of proposed economies already discussed with, and understood by both Government and B.T.C. to be acceptable to the unions concerned. In addition, Sir Brian Robertson, Chairman of the Commission, expressed his willingness to discuss with the unions the setting-up of an inquiry into wage structure. This could be either an independent or an internal inquiry with terms of reference to be agreed. The union representatives undertook to report these proposals to their

executives. The text of a letter from the Minister of Transport & Civil Aviation to the Chairman of the B.T.C. shows that the measures proposed to strengthen the finances of the Commission have been defined and are based on the economies in working. The Minister also stresses the Government's understanding that the unions will accept whatever staff adjustments are necessary to effect the envisaged savings. These, which will augment measures already undertaken by the Commission, may entail further curtailment of services. The Government has recognised the need to accelerate the modernisation of road bridges and level crossings and will examine the adjustment of the Commission's obligations as to their maintenance. The full benefit of all these measures will not be felt immediately, but it is expected that they will result in a progressive financial saving. The B.T.C. still adheres firmly to the principle that it is not able, in its present financial position, to grant wage increases. That an offer has been made, effective within so short a time, points to a strong assumption that money for the increase is expected to begin to materialise within the same period.

Bank Loan for Nigeria

THE confidence displayed by Chief Festus Okotie-Eboh, Federal Minister of Finance for Nigeria, who said in London recently that he hoped to obtain a substantial loan from the International Bank towards the cost of the Nigerian Railway extension from Kuru to Maiduguri, has been fully justified by the Bank's decision to extend a loan of \$28,000,000. The estimated cost of the 400-mile extension is in the region of £20,000,000, but it has already been agreed that the balance would be found from the Nigerian Economic Development Fund and by the Nigerian Railway Corporation. The importance attached to this extension by the Nigerian Railway, and its effects on the economic development of the north-eastern territories, is exemplified by the placing of the first contract for construction of 78 miles of 3-ft. 6-in. gauge line from Kuru to Bauchi, details of which are given in the Contracts and Tenders columns elsewhere in this issue. It seems probable that further orders will be placed in the near future so that the extension can be completed at the earliest possible date.

"Day-Line" Tickets

THE North Eastern Region of British Railways has introduced a new tourist facility, the "Day-Line" ticket. This is described in this week's News Section. The new facility should prove popular with the travelling public: the North of England is rich in fine scenery and objects of historic interest. Rather surprisingly, the only direct reference in the publicity literature to these tourist attractions is a statement that there is "a wealth of interesting territory to explore." The main accent is laid on the possible mileage which may be covered, and suggested tours appear to have been worked out solely to enable the customer to get his moneysworth in this respect. Careful examination of these schedules might well shake the resolve of the most hardened hustler. It may be claimed that the tickets are for go-as-you-please travel and that weaker spirits may shorten their tours and break their journeys as they think fit. The theory is good, but there are objections to its practice. For one thing, the times of arrival and departure to and from principal stations included in the folder do not help tourists to time their arrivals at intermediate points. Reference to the complications of a railway timetable is usually avoided by the ordinary traveller who, in any event, would probably prefer to adopt the certainty of an expertly-devised schedule to one of his own making.

Some Publicity Suggestions

SEVERAL modifications might advantageously be made to these publicity folders. First, suggested tours might vary in mileage to suit all energies. If refreshment facilities cannot be provided en route, breaks might be

timed to allow meals to be taken at places of historic or scenic interest and lengthened sufficiently to give good opportunities for sight-seeing. Stress could be laid on one really long tour to show enthusiasts what they can achieve with determination and the maps should be enlarged for improved legibility. Prominent reference could be made to the packed meals provided on order by the Hotels & Catering Services, and intending travellers should be warned of the lack of train refreshment facilities. Tourist attractions might be listed and, last but certainly not least, a more detailed description of the diesel coaches could be given.

Standard Gauge Lines in Iraq

A STANDARD-GAUGE line between Baghdad and Basra, on the Persian Gulf, now being planned by the Iraqi State Railways with the help of American consultants, has long been under consideration. It formed part of the Baghdad Railway project before the war of 1914-18, and part of such a line was built with German help under the Ottoman Empire. During the first world war a metre-gauge line was built from the Gulf to Baghdad, and has conveyed a considerable traffic. The Iraqi State standard-gauge lines connect with the Turkish and Syrian standard-gauge systems, allowing of through running to the Mediterranean and the Bosphorus. Transshipment to and from the metre gauge is necessary at Baghdad, of traffic between the region north of Baghdad, and the Gulf. Conversion of the metre-gauge line to standard gauge was proposed some years ago, but found too costly.

Transcontinental Travel in Australia

THE comfort and speed of east-west railway travel across Australia have much increased in recent years with the aid of air conditioning and diesel haulage. Nevertheless the breaks of gauge are a nuisance, despite the steps taken to minimise inconvenience at changing points, such as cross-platform interchange and free transfer of hand baggage. Between Melbourne and Perth there are three changes, including two breaks of gauge. Despite this, long-distance passenger trains are reported to be well patronised, as for instance over the Trans-Australian line of the Commonwealth Government Railways. The transcontinental trains, five a week each way, are well equipped in every respect, and meals are included in the fare; but the journey across the wastes of Nullarbor Plain is of small scenic interest. Despite this, transcontinental railway traffic is holding its own with ship and air; trains are stated to be well booked up, and recent publicity stresses that bookings open six months in advance.

Government Road Transport Policy

THE Government's policy on free enterprise road haulage in the national transport system was stated by Mr. G. R. H. Nugent, Joint Parliamentary Secretary, Ministry of Transport & Civil Aviation, at the annual luncheon of the Road Haulage Association, held on April 13. He pointed out that it was not the purpose of the Government to support friend or enemy of the road haulier, but to promote competition between all forms of transport, and to encourage modernisation. Only in this way would the country benefit. The Association was bearing a part of the national cost, and Mr. Nugent said that the Government would give it all support in fair competition with other forms of transport. Mr. R. G. Crowther, Chairman of the Association, pointed out that conditions in the industry were not yet settled. The Socialist party had threatened re-nationalisation; the Conservative party had carried out its policy of de-nationalisation—although not in the way the Association had expected. By its policy of economy and efficiency under conditions of competition, trade and industry have never had greater freedom of choice of efficient transport. The Association is to embark on a substantial advertising campaign to make the work of its members known to the country. Their campaign will not attack any govern-

ment. The Association was bitterly disappointed that the present Government has not reduced fuel tax or purchase tax on the commercial vehicle chassis.

Diesel Traction Economics

WHEN diesel traction first begins to take over railway operation from steam, the cream of the traffic duties usually is turned over to the diesel locomotives, so as to make the maximum possible use of their continuous availability, and to justify their high capital cost. As the diesels multiply, by degrees, however, they have also to undertake the minor operating tasks and stand-by duties, in which their tractive capacity and time cannot be so completely utilised, and their advantage then begins to diminish. In the U.S.A., for example, in 1956 the gross ton-miles moved per dollar spent on diesel fuel was 5,301, whereas in 1957 the figure had dropped to 4,994. The corresponding ton-mileage per dollar for steam locomotive coal, on the other hand, rose from 3,087 to 3,109, while the ton-mileage per dollar spent on current for electric locomotives declined from 2,957 to 2,861. In the same two years, the diesel share of U.S.A. freight service rose from 89.1 to 92.8 per cent, while the steam share dropped from 8 per cent to 5.2; the remaining small percentages were of electric haulage (1.9 per cent in each year), and of oil-fired steam power.

Exit the "Twentieth Century Limited"

IF anything were calculated to bring home to the minds of Americans the unhappy state of the railway passenger business, it is the decision of the New York Central System to withdraw from service the "Twentieth Century Limited." Inaugurated in 1902, this famous train in the course of time earned such a reputation that "riding the 'Century'" became an almost essential feature of any comprehensive trip to the U.S.A. At the start it cut to 20 hr. the previous fastest time of 24 hr. over the 961 miles between New York and Chicago—a time which in the course of years came down by stages to 16 hr. westbound and 15½ hr. eastbound. Until last year, when because of reduced traffic it was amalgamated for some months with another express, it had never accommodated any but Pullman passengers, and in later years only in single room cars, a substantial supplementary service charge being levied to cover the expense of the very large train staff carried. In prosperous years, when certain intermediate stops were made, it has been nothing unusual to run the "Century" in five or six portions, but in later years it has carried passengers between New York and Chicago only, in a 17-coach formation.

Further A.C. Electrification in France

THE recent completion of electrification at 25 kV., 50 cycles, of the French National Railways main line between Dôle and Vallorbe, on the Swiss frontier, shows the ease and despatch with which the S.N.C.F. can now convert its lines on this system. There is now electric traction, though at different frequencies, between Paris and Venice on the "Simplon Orient Express" route to Eastern Europe via Vallorbe, and between Paris and Berne and beyond via Pontarlier. Experience gained at Luxembourg and other junctions between the 25 kV., 50 cycles, and another system is reported to have enabled the overhead equipment to be erected quickly and without difficulty at Dôle; to the latter point the line already had been electrified at 1,500 V. d.c. from Dijon. The Dôle-Vallorbe electrification will be followed later this year by further conversions at 1,500 V. in the Rhone Valley and at 25 kV. in the Northern Region.

Difficulties in Western Germany

THE German Federal Railway and its predecessors have long been good customers of the German locomotive industry and indeed of the German railway equipment industries in general. From the earlier part of the last century, the several Government and company-owned railways in what was then a number of sovereign States, began to order their rolling stock and other requirements from

German, and in some cases British, manufacturers. No attempt was made by the railways to set up plants for building new locomotives and vehicles to the extent that this was already being done by the British railway companies. The railways became, and the Bundesbahn remains, a mainstay of sections of the national industry. Whether the Federal Railway will be able to order equipment to the same value during the current year is problematical. Traffic receipts so far this year have been disappointing, despite the increase from February 1 in freight rates and passenger fares; and negotiations progress with the trades unions over higher pay and reductions in working hours may well result in great advances in expenditure. Nor, according to reports, can the railway management be confident of receiving assistance from the Government in the form of a subsidy to offset working losses, or a loan for modernisation and improvements; but the Government may feel that such help is necessary, if only to enable the Federal Railway to support industry.

Diesel-Hydraulic Railcars in North America

IN the United States and Canada, as in Great Britain, the lightweight diesel railcar is proving increasingly popular as a means of cutting operating costs and increasing passenger patronage on subsidiary main and branch line services that have been steadily losing money. The Budd "RDC" type of railcar is much used in North America on services ranging from a 924-mile through run of a single car between Salt Lake City and Chicago to a triple-unit restaurant car train between Philadelphia and Pittsburgh, and other multiple-unit assemblies in heavily-used suburban services round large cities. One advantage is that the 600-h.p. power plant, with fuel and water tanks and all accessories, is located beneath the car floor, leaving the whole 85-ft. length of each car available for revenue purposes. The "RDC" cars differ from all other diesel motive power in the U.S.A. in that their transmission is hydraulic, by torque-converter, rather than electric, so that space, weight and unnecessary complication are all avoided; they can accelerate to 60 m.p.h. in less than 2 min. from a standing start, and to 85 m.p.h. in 8 min. running over level track. Once again American railways have gained by acceptance of a manufacturer's standard design, which has now been built to a total of between 300 and 400 units, and is reported to be showing availability of 95 per cent.

A Helpful Report

WHEN the Select Committee on Nationalised Industries was appointed to inquire into the reports and accounts of those industries there were considerable doubts as to whether it could serve a useful purpose; whether it would not prove more of a hindrance than help to the public corporations in the exercise of their responsibilities. It was set up nevertheless because many Members of Parliament, and not only those most opposed to public ownership, considered that the relationship between Parliament and the boards of public corporations was unsatisfactory, inasmuch as Members were unable to exercise adequate control over them—particularly over investment—and were inadequately informed as to their activities. In other words, the problem of their public accountability had not been solved. Others, however, including most of the Opposition who divided against its appointment when debated in Parliament, were fearful lest a Select Committee would become a smearing committee, that the opponents of nationalisation, whether on doctrinaire or political grounds, would use it for purposes of probing into mistakes of management, and magnify them out of all proportion with a view to discrediting the boards. Less political fears were that if a Parliamentary committee were set up to watch over the nationalised industries it would interfere with the managerial independence of the boards, restrict initiative and enterprise, and undermine that very principle of managerial autonomy which was the original reason for the choice of public corporations as

the vehicle for nationalisation. There was fear that with a watchdog committee at Westminster the boards would develop an inhibiting "looking over the shoulder" attitude. The Trades Union Congress, anxious to preserve independent collective bargaining, feared that the committee would probe into working conditions.

The first major report of the Select Committee, now published, largely proves these fears to be unfounded. For the first inquiries the Committee selected the two Scottish electricity boards, and its report upon them was largely factual and no guide to its future work. The present report is on the National Coal Board, its inquiry into which has extended from July last year, and should prove helpful both to the Coal Board and to Parliament. The approach has been cautious and objective, and, with becoming modesty, the Committee states that "in much of the enquiry, it was a case of laymen hearing technical evidence from one quarter only," i.e., the Coal Board; and in explaining its objective it states that "There is little experience, and tradition, on which to have based this enquiry . . . nevertheless an attempt has been made to gather, sift, and test a large amount of information likely to be of interest to Members, and to comment on it." In doing so certain conclusions in regard to policies and practices pursued by the Coal Board are of such interest that they might be considered of general application to all nationalised boards, including the British Transport Commission, despite the difference between an extractive industry like coal and a service industry like transport. The major constructive conclusions are in regard to prices and investment. Unlike the B.T.C., the Coal Board is not subject to a price-fixing tribunal but operates under a gentlemen's agreement which requires submission of proposed changes in prices to the Minister and his approval before their implementation. The Committee comments that it dislikes this informality and proposes that when alterations in price are proposed the Board should consult the Minister, and, having done so, should itself take full responsibility for them; but, and this is the important innovation, that the Minister should have statutory power to give the National Coal Board specific directions in regard to prices and disclose any exercise of them to Parliament. This means that where the Minister disallows or changes proposed alterations in prices it should be made clear beyond doubt that he has done so: the responsibility is his and not that of the Board. This has a bearing on British Transport Commission practice, because with the greater flexibility the Commission now enjoys in regard to charges, the Transport Tribunal plays the lesser role, and, in recent years, the Minister of Transport has played the greater. Influence over the Commission's charges has not always been statutorily exercised nor necessarily clearly defined or revealed. Were he given this statutory power as the Committee proposes for the National Coal Board, the Tribunal would become redundant as regards charges, but the respective responsibilities of Minister and Commission would be better defined and revealed. Whether the time is yet ripe for such a significant change in price-fixing policy for the Commission needs further consideration. It must not be made before it has been given the most careful thought.

When the Government announced its intention in 1956 of appointing a Select Committee on Nationalised Industries it was commented in these columns that how far it would succeed in its purpose depended largely on its membership, and on its approach. Both have apparently been satisfactory. Under the able direction of its Chairman, Sir Toby Low, M.P., the Committee, to which, wisely, none of the best known partisan opponents of nationalisation was appointed, has approached its task not in the spirit of hostile critics, but as an objective body anxious to find out, and the better to inform Parliament, about the difficulties, successes, and failure, of the Board, and to consider its relationship to Government and Parliament. In this the Committee has succeeded, and if this sets the precedent for the future, as it is to be hoped it will, fears of this extension of public accountability should now be laid to rest.

Ulster Transport in 1956-57

THE ninth annual report of the Ulster Transport Authority, signed by Mr. G. B. Howden, the Chairman, and Mr. J. Sydney Rodgers, a Member of the Authority, covers the year ended September 30, 1957. It shows a surplus of £93,772 on the year's workings, the first since the Authority was formed in 1948. The trading balance was £302,365, an improvement of £413,580 over the previous year. The surplus reduces the deficiency on the nine years' operations to £2,400,453.

Some of the principal results for the past three years are given below:—

	1955 £	1956 £	1957 £
Railway passenger traffic	677,468	687,305	773,544
Rails and road freight traffic	1,937,211	1,931,402	2,105,491
Parcels, luggage, etc.	253,970	264,050	307,295
Bus services	3,171,096	3,337,921	3,626,768
Hotels and catering	431,398	482,871	490,898
Revenue	6,516,637	6,748,795	7,357,328
Expenditure	6,703,705	6,860,010	7,054,963
Net operating revenue	-187,068	-111,215	302,365
Miles of railway open	279	277	277
Route mileage, buses	2,657	2,670	2,620

Passenger services were provided throughout the year over 134 of the 167 route-miles of railway open to traffic. The remaining 33 miles were used only for freight services and occasional excursion trains. Passenger train-miles fell by 71,158 from the previous year to 1,497,961, and passenger train journeys by 182,493 to 7,615,891. Freight train mileage was 161,200, an increase of 437 compared with the previous year. Merchandise carryings amounted to 282,449 tons, a decrease of 10,107, while, as in the previous year, practically no livestock passed by rail.

During the year the Authority developed diesel rail traction for both passenger and freight train working. Eight passenger coaches were converted as railcars, as described in our January 17 issue, and are now providing a fast passenger service between Belfast York Road and Londonderry Waterside. They are so designed as to be capable of working with goods vehicles.

The U.T.A. received orders for abandonment from the Ministry of Commerce covering 158 miles of track from which passenger and goods services had been permanently withdrawn. The report points out that the growing use of private transport has a very noticeable effect on the passenger-carrying activities. The favourable result for the year was secured despite the fact that the cost of providing rail services, as a whole, was still substantially greater than the revenue which they were able to earn, so that interest and redemption charges appropriate to the railway portion of the undertaking had to be met out of the balance available, after providing in full for expenditure, including renewals provisions, from the other sections of the U.T.A. undertaking. The road passenger services, road freight services, and the hotel and catering services not only earned enough to cover all the expenditure involved in working them, but also provided balances, which, in total, more than covered interest and redemption charges for the entire undertaking.

Signal Engineers Visit Denmark

ALTHOUGH papers dealing with signalling in Scandinavian countries occasionally have been read before the Institution of Railway Signal Engineers, that body has hitherto held no summer convention in those parts. This month, however, the President of the Institution, Mr. J. F. H. Tyler, leads members on a visit paid by invitation of the Management of the Danish State Railways to installations on its system. The main features of these have already been comprehensively described to the Institution by Mr. W. Wessel Hansen and Mr. James Steffensen (see our issue of January 11, 1957). The State-owned lines in Denmark comprise some 1,600 route-miles, the operation of which is hampered by the necessary use of train ferries used for through running with neighbouring countries and, in certain cases, for internal communication. At present, Danish signalling is on the whole much less elaborate than that of Great Britain, for traffic is

light on most sections. Changing conditions now make it imperative to reduce costs and, where possible, to improve train services. Special circumstances ruling at many locations are reflected not only in details of equipment but also in signal aspects which present features peculiar to the country and are of much interest. Light signals, always dimmed during darkness, are now exclusively used in new work and the semaphore is disappearing.

Mechanical signalling had followed German practice in essentials. Double-wire transmissions for both signals and points became standard, with trailable point mechanisms, point indicators, and other features characteristic of Central European methods. A great part of the mileage was operated by simple telegraphic or, later, telephonic messages but, on the more heavily-worked lines, the German a.c. interlocking block eventually was installed. To guard against interference from power mains, the interlocking block is being replaced where necessary by a more modern design. Electric power working had appeared early in the century and, with the introduction of electric traction in the Copenhagen area, automatic signalling replaced the ordinary block, eventually with colour-light signals. All equipment was well constructed and maintained and a high level of safety has been achieved. Accidents are rare on Danish lines and only one attributable to excessive speed at a turnout is known.

Until the recent war these methods continued in use, all detailed design work being left to manufacturers in Germany or Sweden. It was then decided that railway staff should undertake this work. Attention was first concentrated on improvement of certain mechanical and electric details. Modified types of individual lever power frame, point machine, light signal components, etc., resulted while the development of a local signalling industry was encouraged. A form of relay interlocking was then elaborated and now has replaced much older equipment, with noticeable operating and economic advantages at many stations. Reformed signal aspects, resting on the speed signalling principle, were adopted. Route setting has not been introduced. Apart from the fact that point indicators are still extensively used in shunting work, difficulties met in winter from drifting snow render indispensable a means of reversing individually any pair of points. It was therefore considered preferable that signalmen should be kept daily familiar with the settings required for the various routes, while nowhere are conditions such that the few seconds gained by route actuation—at the expense of extra equipment—could bring appreciable advantages. The apparatus itself, particularly as regards relay design, shows considerable Continental influence. Remote control over several stations along a route, with modern train-describing and recording equipment and long-length track circuits, is being applied and no doubt will increasingly replace older methods.

Concrete Sleepers

NOW that the uneven distribution of timber suitable for sleepers assures the economic use of some form of concrete sleeper in many countries, the problems are to decide: (1) in what form, and (2) manner rails carrying frequent, fast and heavy traffic shall be fastened to it. The development of the concrete sleeper is taking a normal course; earlier types are being superseded by improved designs. For instance, the R.C. sleeper has been replaced by the pre-stressed variety, the French "Vagneux" type has been ousted by the "R.S.," and rigid clips and rubber soleplates are being replaced by elastic fastenings, notably of the "R.N." spring clip and grooved rubber pad double-elastic fastening. British, French and German practices in concrete-sleeper development have been the subjects of articles in our pages at various times, but discussion is carried a step further by a thesis recently submitted by Mr. J. L. Harmen to the Association of Professional Engineers of the Province of Ontario, Canada.

After briefly surveying the general characteristics and functions of sleepers, the shortcomings of the R.C. type

and the fundamental change created by the substitution of pre-stressing, this thesis explains the necessity for exhaustive study to counteract the results of severe high-frequency vibration—caused by heavy fast traffic—by damping it down and so protecting the concrete from damage. Some of the most comprehensive investigations on these lines, and in connection with long welded rails, have been carried out on the French National Railways under Monsieur Robert Levi, Directeur des Installations Fixes (Chief Civil Engineer), leading to remarkable reductions in maintenance costs of 60-70 per cent, and to higher speeds, lower fuel consumption, smoother travelling, less wear in rolling stock and longer life of rails.

Mr. Harmsen then outlines the theory of tensional cracking in concrete, and the value of pre-stressing to overcome the low tensile strength of concrete causing this damage. Diagrams and calculations are given to evaluate the bending moments resulting from combined vertical and transverse loading of the rail. As the governing bending force is repeated millions of times, demanding an abnormal safety factor, the tensile stress of the concrete is limited to 350 lb. per sq. in. against 950 lb. specified.

Typical examples of modern concrete sleepers are then reviewed, notably the English Dow-Mac and Stent, the German "B53V," and the French "V.W.," all with their tensioning steel and concrete bonded together and pre-tensioned. Of the types without this bonding and post-tensioned, the German "B53" and "B55," and Belgian Franki-Bagon are described. Finally, the French "mixed" (steel and concrete) "R.S." sleeper is dealt with in some detail; all these types are described and illustrated.

The only disadvantages of the Dow-Mac sleeper mentioned by Mr. Harmsen, are its weight and the liability of the exposed ends of the cut pre-tensioning wires to be affected by rust. The Stent type, he points out, has more positive and less vulnerable anchorage. The German "B53" and the "B55" now superseding it, have two elongated-U-shaped tensioning rods, the equivalent of four parallel rods arranged in the shape of an X in section. They are of silicon spring steel with a yield stress of 76,000 lb. per sq. in. Their advantage is that the compression can be checked and the tension can be adjusted at any time in or out of the track by tightening the nuts at the ends of the bars. Over 1,000,000 are in service on the German State Railways.

A few details of the S.N.C.F. "R.S." sleeper not previously given in our pages are included in the thesis. Named after Monsieur R. Sonnevill, this modern edition of the Vagneux sleeper has a different L-shaped tie-bar of rail-steel with flanges 8 mm. thick. It extends right through each R.C. block to the outer face, thus providing the principal reinforcement; there is also mesh reinforcement at the top and bottom of each block and spiral wire round the bar, all of soft steel and the whole specially designed to counteract vibration. The bolts securing the spring-clip rail fastenings are anchored in slots in the vertical flange of the tie-bar, thus eliminating all strain on the concrete.

The advantages claimed for this sleeper are simplicity in design, easy manufacture, and lower cost than pre-stressed sleepers. It is also lighter than the all-concrete sleeper and, having four vertical faces buried in the ballast, provides excellent resistance to lateral thrust. No wooden plugs or sleeves are necessary to hold coach screws, the high-grade steel tie-bar provides remarkable flexibility, and no troughing in the ballast is required to avoid centre-binding. Here again more than 2,000,000 "R.S." sleepers are in the road in France alone, as well as many more in other countries, and are giving great satisfaction under most severe conditions.

Germany is stated still to adhere to the comparatively-rigid bolt-and-clip and rubber-pad fastenings of three types, but in several other countries some form of more-elastic fastening is preferred, the better to prevent transmission of high-frequency vibration to concrete sleepers. Felt or rubber pads partly achieve this end but are inclined to slip or creep, and to obtain better results extensive laboratory research with scientific instruments and vibra-

tory testing plant was instituted. It led to on-line trials and subsequent adoption of the "R.N." chrome-manganese spring clip—bolted in the "R.S." sleeper to the tie-bar—in conjunction with a grooved rubber pad under the rail. Together they provide "damped elastic suspension without play," for though the rail and sleeper have relative elastic movement, they yet remain closely interlocked. Moreover, these fastenings anchor the rail sufficiently securely to absorb stresses set up in long welded rails by changes in temperature and to prevent creep. Since 1947 no fewer than 30,000,000 "R.N." fastenings have been fitted in France to all types of sleeper including wooden.

It would be reassuring, however, to hear that in the road no appreciable variation of gauge is caused by "R.S." sleeper blocks becoming out of the horizontal because of uneven packing, as sometimes occurred in the fundamentally rather-similar and half-century-older cast-iron plate-and-tie-bar sleeper widely used in India.

Stockholm Underground Railway

WITH a population of about 750,000 Stockholm is situated on the Norrström channel forming the outlet from the Mälär Lake to the Baltic sea. Like London and other great cities its transport is controlled by an authority known as Stockholm Passenger Transport (Company). As well as the usual surface transport there are now 18½ route-miles of 4 ft. 8½-in. gauge railway, the Stockholm Underground System; further extensions are either already under construction or planned for the next decade.

The system has been built up gradually stage by stage, and the first section to be completed was from Slussen in the city, southwards to Skanstull in 1933. Though this was only a short section, it was in tunnel and was later extended, initially as a surface tramway with overhead current transmission. It was, however, subsequently converted to multiple-unit underground railway standards with third-rail transmission and was opened to Hökarängen in 1950. Four years later a branch south-westwards from that line at Johanneshov was completed to Högdalen; these two lines form the Southern Section of the system.

Meanwhile, construction of the Western Section had begun in 1945, and the 8½ miles of line from the city centre at Kungsgatan to Vällingby was opened in 1952; 2½ miles of this section are in tunnel, and the section was extended to Håsselby Gård in 1956. There was, therefore, still a gap between the Southern and Western Sections, namely between their respective city termini at Slussen and Hörtorget, as Kungsgatan station is now known. The gap was closed by the completion of the Central Section between these termini on November 24, 1957. Though the Central Section is only 1·3 miles in length it is all in tunnel under the centre of the city and the Norrström, and is the most important part of the system. The greater part of it has been constructed for quadruple tracks.

The existing 18½ miles of line has 39 stations, eight of them underground, but the system is at present being extended (a) from Hammarby on the Southern Section to Skarpnäck, (b) from Hökarängen to Farsta, (c) from Högdalen to Rågsved and possibly beyond and (d) from Håsselby Gård to Håsselby Strand; the map, on another page, accompanying an article describing the construction of the Central Section, illustrates these and other extensions and existing lines. Two further important extensions proposed for the near future are towards Fruängen and Mälärhöjden to form a future South Western Section, and also another to Östermalmstorg to the east of the city. It will be noted that these three extensions together will form a new east to south-west route crossing the Central Section. Actually, their double-track line will run parallel to that of the Central Section from Centralen to Slussen, and this is the reason why the tunnels on this length have been built for four tracks. These extensions are expected to be completed about 1964 and will add a further 15 stations to the number at present on the system.

The standard type of underground station has stairways from street level down to the booking hall, whence

escalators and stairs lead to the platform; the platforms are 480 ft. long to take eight-car trains. At the new Centralen underground station—which is connected by a subway with the Swedish State Railways main line Centralen—the four tracks are in pairs, one pair directly over the other, but in each pair there is one Central Section track and one East-South West Section track. In this way the two northbound tracks—one of each section—are at one level and the two southbound ones are at the other level. With an island platform between the two tracks at each level interchange of passengers between the sections is facilitated, namely from West to East, and South-West to South and vice versa. Incidentally, this arrangement of two levels was also dictated by the fact that they are both in tunnel through hard rock and a large single bore accommodating both levels was convenient and economical, as pointed out in the article describing the construction. At the other new intermediate station on that section, Gamla Stan, the four tracks are all at the same level, and there facilities are provided for interchange of passengers between East and South and West and South-West.

Existing rolling stock consists of 350 cars but a further 100 are being added shortly; they are designed to the New York Subway standard but are built under licence in Sweden. Each car has four 108-h.p. motors, two on each bogie. Combined electro-dynamic resistance and air brakes are fitted and current is supplied through a third rail. Maximum speed is 46 m.p.h. Centralised traffic control and cab-signalling are installed, the latter indicating permissible speed at any particular place and time, and also applying the brakes if the indicators are disregarded. Points are power-worked and electrically heated in winter. Each train accommodates up to 1,200 passengers and the present rush-hour service is a train every 2½ min. as between the 14 central stations in the city; a 1½-min. train-interval is visualised in the near future with the additional stock.

The Precarious Position of British Railways

(By a correspondent)

IN January the presidents of 21 American railroads testified before a Senate Committee that the outlook for their companies was alarming, if the deteriorating situation were not checked by legislation. The results recorded in No. 3 *Transport Statistics* are a warning that British Railways are also drifting into a precarious position. This edition of the official bulletin gives ton and ton-mile figures for four weeks from February 24 to March 23, ordinarily a period of heavy wagon loading, and complete operating statistics for the first 12 weeks of 1958. The whole of the results are analysed below in comparison with 1957, when railway traffic was influenced by the curtailment of road haulage, and with 1953, the peak year for originating tonnage since nationalisation. There is no escape from the conclusion that, as freight carriers, our railways are retrograding.

In the March period originating tonnage of 20,982,000 was 2,026,000 tons, or 8·8 per cent, below 1957. Merchandise (including livestock) decreased by 603,000 tons (16·5 per cent), minerals by 702,000 tons (13·4 per cent) and coal class traffic by 720,000 tons (5·1 per cent). Against the third period of 1953, the corresponding figures are a total loss of 2,664,000 tons (11 per cent), spread over merchandise 984,000 tons (24 per cent), minerals 593,000 (11 per cent) and coal class traffic 1,087,000 (7 per cent). The volume of ton-miles worked was 234 million less than in 1957 (12·9 per cent), but 303 million below 1953 (16 per cent).

A review of the 12 weeks' statistics shows originating tonnage of 62,945,000, a decrease of 6,530,000 tons, or 9·4 per cent, from 1957. Merchandise was down 1,936,000 tons (17·5 per cent), minerals 1,965,000 tons (12·5 per cent) and coal 2,629,000 (6·1 per cent). Compared with the first 12 weeks of 1953, the railways lost 2,669,000 tons of merchandise (nearly 23 per cent) and

altogether 6,175,000 tons of traffic (8·9 per cent). The ton-mile volume was lower this year by 733 million, or 13·4 per cent.

OPERATING STATISTICS

The number of wagon loadings in 12 weeks fell by 984,000, or 12·5 per cent, to 6,894,000, every Region having a decrease of over 10 per cent. It was interesting to learn that over the same period the U.S.A. railroads loaded only 6,442,448 of their large wagons, which have an average capacity of 53 tons; that was a decrease of 1,489,760—no less than 18·7 per cent—a sure sign of a serious industrial recession in the States. British Railways worked 115,811,000 fewer loaded wagon-miles in 12 weeks, a decrease of 16 per cent. Their average wagon load at starting point rose by 4 per cent to 9·79 tons, owing entirely to better loading of minerals and coal; the average for merchandise and livestock was 3·98 tons, a fraction less than in 1957.

The decline in traffic volume led to a saving of 2,481,000 train-miles. It seems odd that the Eastern Region, which had the highest rate of decrease in tonnage and ton-miles, was able to cut out only 366,000 train-miles (6·2 per cent) while the London Midland saved 846,000 (8·1 per cent), the Western 509,000 (7·8 per cent) and the North Eastern 400,000 (8·5 per cent). Neither was the Eastern so successful as these Regions in curtailing freight engine-hours in traffic, with the result that its freight trains progressed at a speed of 8·65 miles an hour compared with an all-line figure of 8·99. The Eastern, however, kept its train load up to 174 tons, 22 tons above the poor average for the whole system and 28 more than a Western train hauled. The combination of speed and load factors in the statistic "net ton-miles per freight-train mile" showed a 5 per cent lower output of freight train operation over the whole line. Though the Eastern's output was 8 per cent less at 1,260, it was 144 above the all-line statistic and 234 ahead of the Western figure.

It has not been a pleasure to look through these statistical tables and rarely find a plus sign. In considering the railway position a great drawback is the absence of any information about expenditure. We know that at the end of February the operating ratio of the U.S.A. railways was 84·9 per cent against 79·7 per cent a year ago and that 34 individual railroads, including the Pennsylvania and the New York Central, were in deficit, but are left to guess how our railways stand.

FREIGHT ROLLING STOCK

On March 23 British Railways owned 16,762 steam locomotives, of which 2,888, or over 17 per cent, were under repair. The stock was reduced by 166 in the first 12 weeks of this year. The number of diesels (mechanical and hydraulic) was increased by 21, to 165, but the number under repair was 22, or 13·3 per cent, against 12 at the end of 1957, or 8·3 per cent. The diesel-electric stock was raised by 49 units during the 12 weeks to 707, of which 79, or 11·1 per cent, were under repair at March 23. These repair percentages are excessive and do not justify the notion that immediate economies can be made by extending the use of diesel motive power on a large scale.

Recent experience with diesel multiple-unit passenger carriages is equally disquieting. These numbered 1,650 at March 23, when 166 (10·3 per cent) were under repair. At the end of 1957, out of a stock of 1,349, the number under repair was 114 (8·4 per cent). Though 301 new vehicles went into traffic this year, only 249 more carriages were available at March 23. It is generally assumed that the diesel sets are a success because they attract additional passengers but what matters is the net revenue earned and the repair figures prove that total working costs must be high.

At March 23 the stock of freight vehicles was reduced by 1,819 to 1,103,070, of which 61,602 were under repair. The repairs percentage of 5·5 per cent, which was the target of the Railway Executive in the early years of nationalisation, has thus been attained again, as it was at the close of 1956.

THE SCRAP HEAP

A Brazilian Centenary

The Central Railway of Brazil completed 100 years' existence on March 29. On that date in 1858 were inaugurated the first 30 miles of the Estrada de Ferro Dom Pedro II, as the railway was then known, built by Edward Price from the Imperial Palace at São Cristóvão to Queimados, in the State of Rio. The extension to Belem, now known as Japeri, at the foot of the Serra do Mar, was inaugurated on November 8 of the same year. The first railway in Brazil was the 10-mile Mána Railway, inaugurated by the Emperor Dom Pedro II, in April, 1854. The 5-ft. 3-in. gauge was adopted for the early Brazilian lines. This is one reason for discounting the suggestion so often made that Argentina chose the 5-ft. 6-in. gauge because its first locomotive had been built for India, where lines already had been built to that gauge, to which also the first line had been built in Chile in 1852. It is not clear why 5 ft. 3 in. was chosen in Brazil, for there seems to have been no connection with Ireland, where it is standard.

Lions in the Path

Between Broken Hill and Sakania, on the "Robert William's Railway" as they called it, no one bothered much about running times. There were hot boxes and engine breakdowns to contend with. . . . There was game in profusion—lion, eland, and rhino, in fact, anything you might like to shoot. Sometimes the train was stopped and the crew went hunting.

When up the line the guard would frequently ask me to "watch that box" and if I saw smoke coming from it to

tell him. Sometimes a passenger train would be parted, and one half parked in a spur. The engine would return for it later. Meanwhile the passengers merely wandered about. "No steam" was one excuse; "grasshoppers" was another and was duly recorded in the journal. . . .

One day I shot a lion from the van. On one occasion I had a strap round my food tin and my overcoat thrown over the lid. I had purchased a piece of meat and just pushed it under the coat. I then went across to the telephone and when I came back the box had gone. . . . A lion had got into the van and taken my meat.—*From reminiscences of early days in Northern Rhodesia, by "A.W.W." in the "Rhodesia Railways Magazine."*

Gold Rush Railway

It is understood that the Canadian Government will propose to Parliament a new contract to construct a railway to the Yukon, the line being all Canadian. In this scheme it will run from Port Simpson to Teslin Lake, a distance of 450 miles. The subsidy will probably be \$80,000 annually for 20 years in addition to a land grant of 10,000 acres per mile.—*From "The Financial Times," May 12, 1898.*

(The line was never built. Construction of the 3-ft. gauge White Pass & Yukon Railway, which runs from the Alaska port of Skagway northwards into Yukon Territory, began in June, 1898.)

Robot Locomotive

According to Mr. Josif Kusmin, Soviet Deputy Premier & Chief Economic Planner, Russia, has built the world's first "robot" locomotive. Mr.

Kusmin, who was addressing a mechanisation and automation conference in the Kremlin, said that the robot engine driver, a unique self-adjusting automatic control system, could drive a locomotive without human aid better than the most experienced human driver. It was completing tests near Moscow and ran "exactly to schedule."

Book Launched in Train

To launch a book which will surely float well an unusual place was chosen for the launching party. This was the Trianon Bar on the "Golden Arrow." There were two or more reasons for it. The "Golden Arrow" flies to Paris—in 7 hr. 45 min. The author of the book, which is called "The Way to the Tumbrils," is Sir John Elliot.

The "Golden Arrow" began its career in 1929 when he was Public Relations Officer to the Southern Railway. He invented the Trianon Bar later when he was Deputy General Manager by transforming a Pullman.

In the days before nationalisation this bedecked train, with its flags renewed every day, left at 11 a.m. Now it goes at 2 p.m.—an hour at which no one wants to leave London—and reaches Paris at 9.45 p.m.—"Peterborough," in "The Daily Telegraph."

Safer by Rail

I attempted to compare the official statistical accident figures for rail and air travel. I found that one out of 10,000,000 passengers was killed on British Railways (average 1951-6), while one out of 46,100 passengers of all airlines and chartered planes operating from Britain met with a fatal accident (average 1950-4). . . . The average flight covers much greater distances than the average rail journey, but this comparison is not too reassuring either; one passenger killed per 210,000,000 miles of rail travel, one air passenger killed per 31,140,000 passenger miles flown by all airlines.—*From a letter to "The Manchester Guardian."*

Jargonitis

(See our April 18 issue)

We have gathered the impression
That the smug old word "concession"
Is a trifle controversial
When applied to things commercial
And as open to perversion
As our ancient friend "excursion."
In the dear, dead days, now far-gone,
We waged war on all this jargon;
Using English, good and plain,
We brought business to the train
And, some may still recall,
Got some profit from it all.
If there should be any fuss
'Twixt the customer and us,
Well—we realised he might
Very possibly be right.
Vigilance still seems the fee
Man must pay for liberty.
So, if jargon lifts its head,
Hit it hard. It's better dead!

A. B.

Unusual View from the Menai Bridge



Photo]

[D. J. W. Brough

View towards the mainland from a tower of the Britannia Tubular Bridge, showing Holyhead to Chester main line curving left towards Menai Bridge Station, the junction with the Caernarvon branch (in middle distance)

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

INDIA

Brochure on Railway Careers

The Railway Board has published a small brochure, "Railway Careers," describing briefly the different types of jobs offered by the Indian railways, their future prospects, emoluments, educational and technical qualifications required and age limits prescribed for recruitment.

The brochure costs 25 naya paise and is on sale with the Manager of Publications' agencies stocking Government of India publications.

Asansol Marshalling Yard

The work of remodelling the marshalling yard at Asansol will, it is estimated, cost Rs. 45 lakhs.

The yard has reached saturation point. In October last, it dealt with about 67,000 wagons, against the monthly average of about 48,000 in 1948.

When remodelled, the yard will enable the Eastern Railway to handle smoothly the increasing flow of general goods traffic from Calcutta and also the additional tonnage of coal raised in the Asansol-Raniganj coal region.

Chola Power Plant Taken Over

The Central Railway has assumed ownership and control of the Bombay State Electricity Board 54,000-kW. thermal generating plant at Chola, near Kalyan, adjoining the railway's own power house.

Chola power house was commissioned into service in 1929 with an installed capacity of 40,000 kW. for supplying

the main-line electrification requirements of the former G.I.P.R. The capacity of the power plant was augmented by 24,000 kW. during the 1957 extensions commissioned into service during 1952-53. This augmentation, however, did not relieve the overall power shortage for the Bombay-Poona area to any appreciable extent. The second extension on the Bombay Government account consisted of a total maximum generating capacity of 54,000 kW. and went into operation towards the beginning of 1954. With the purchase of the Bombay State Electricity Board portion of the plant by the Central Railway, the entire plant now comes under the unified control of the railway.

TASMANIA

Timber Impregnation

A timber impregnation company has been established in the Northern part of Tasmania, to which the Tasmanian Government Railways propose to forward sleepers for treatment. Experiments have shown that the life of treated sleepers can be prolonged by as much as 200 per cent.

The sleepers are first stacked and left to air season until a moisture content of 25 to 30 per cent is reached. All necessary boring and checking is carried out and they are then stacked on bogies and wheeled into the treatment cylinder. The cylinder is sealed and 29 in. of vacuum is applied for 30 min. to draw the air from the wood cells. This vacuum is held whilst the cylinder is

filled with the preserving compound, Tanalith C, at a temperature of 180°. The vacuum is then released and the pressure within the cylinder raised to the region of 1,000 lb. in., so forcing the preservative into the wood cells. This pressure is maintained for 3 to 4 hr. according to the class of timber under treatment and is then released and the fluid drawn from the cylinder. The process is completed by the application of a vacuum to draw surplus preservative from the timber, the sleepers then being transported from the cylinder to stacks ready for use. The preservative, Tanalith C, is a copper chrome arsenic compound consisting of potassium dichromate 45 per cent, copper sulphate 35 per cent, and arsenic pentoxide 20 per cent.

CANADA

Cafeteria Service in Maritimes

Cafeteria service was introduced on the Canadian National Railways "Maritime Express" between Halifax and Montreal on April 27, when the new timetable came into operation. The meals are of the same standard as on regular C.N.R. dining cars, but savings from the new-style operation are being passed on to the travelling public in the form of lower prices for meals.

UNITED STATES

Economy Cuts

In their continuing endeavours to make ends meet, the railways are taking increasingly drastic measures. The Pennsylvania Railroad has cut by 10 per cent the salaries of all employees earning more than \$10,000 a year, the President included. Departmental chiefs on the New York, New Haven & Hartford Railroad have been instructed to cut their payrolls by up to 6 per cent if possible. The New York Central System has abolished the position of Chairman of the Board held by the late Mr. R. R. Young, but Mr. Alfred E. Perlman remains as President and Chief Executive Officer.

High Speed Single Line Operation

The Grand Trunk Western Railroad (a subsidiary of the Canadian National) has converted 60½ miles of its 80-mile main line between Durand and Port Huron, Michigan, from double to single track. The latter extends from East Durand to West Tappan, save for 12½ miles of double line which has been left unaltered between West and East Flint, and for three intermediate passing loops. The latter are all nearly two miles long, and can accommodate from 208 to 290 bogie wagons; the general length of freight trains varies from 125 to 145 bogie wagons.

At the ends of double track at

Diesel Operation in Canada



The C.P.R. "Canadian", consisting of Budd stainless steel stock, crossing Stony Creek Bridge, British Columbia

Durand, East and West Flint, equilateral turnouts have been laid, with 1 in 20 crossings and 39 ft. curved switch-rails, that can be taken in either direction by passenger trains at speeds up to 79 m.p.h., and freight trains at up to 60 m.p.h., both facing and trailing. Other turnouts from single to double track are laid with 33 ft. curved switch-rails and 1 in 20 crossings, and may be run through at speeds up to 60 m.p.h. The fastest passenger train, the "International Limited," is timed at an average of more than 60 m.p.h. over this section.

C.T.C. has replaced the former automatic block signalling, and the long loops are intended to permit opposing trains to cross one another without either coming to a stand.

Erie-Lackawanna Joint Plan

Application is being made to the Interstate Commerce Commission by the Erie and Delaware, Lackawanna & Western Railroads to authorise joint use by both railways of the former's double-track main line for 75 miles between Binghamton and a point just short of Corning, New York State. The Lackawanna double-track line parallels that of the Erie over this distance, and if the proposal is agreed, the latter will be able to take up a total of 121 miles of track.

The Erie line would be resignalled to cope with a maximum density of 60 trains daily, and the saving in maintenance and operation expected would be about \$1,100,000 annually. The Erie passenger station at Binghamton would be used by both companies.

ARGENTINA

Statutes of State Railways

The statutes of the State Railways (F.D.E.A.) have been modified so that the Board of Directors will consist of

a president and nine members, six with railway, industrial, commercial or financial experience, the remaining three being railway officials in active service and with more than 25 years' experience. The new statutes provide for an Administrator General and six superintendents (Traffic, Traction & Shops, Way & Works, Personnel & Labour, Purchases & Stores, and Finance & Accountancy). The different lines will be headed by Administrators, responsible to the Administrator General.

Previously, there were 12 members; six were the Administrators General of the different railways.

Additional Wage Award

The final agreement between the authorities and the railwaymen's unions, ending the strike which started in March, was drawn up to include a mass global increase of 450 pesos for all grades. The train control employees of all lines, however, were not satisfied, and started a separate strike of four hr. a shift, which had the effect of disrupting main line traffic, although on the Buenos Aires suburban services, no disorganisation was apparent. Negotiations were started with the Union Ferroviaria, and the question was finally settled by granting an additional increase of 20 per cent over that of 50 per cent given in February, 1956—with retroactive effect from that date—to be added to the blanket increase of 450 pesos.

SPAIN

New C.T.C. Installation

The success of the C.T.C. equipment on the Ponferrada incline, on the León-Monforte line in Galicia, described in *The Railway Gazette* of April 1, 1955, and covering a distance of 58 miles, induced the R.E.N.F.E.

management to consider application of C.T.C. elsewhere. A further installation has accordingly been placed in service between Seville and Jerez de la Frontera, 65 miles, on the line to Cadiz, whither the working is eventually to be extended, to assist operation of lines in Andalusia. The control panel, at the St. Bernado station at Seville, is of the form used in most cases for such work and carries a track diagram covering some 15 loop stations. Signals are colour-light.

PORTUGAL

Second Six-Year Plan

The second Portuguese six-year development plan proposes the electrification of the Lisbon-Oporto main line from Entroncamento northwards, and the construction of a bridge over the River Tagus at Lisbon, probably to be followed by a railway tunnel. The electrification of the main line from Lisbon to Entroncamento has already been completed.

NETHERLANDS

Couchette Coaches

From June 1, the Netherlands Railways are to introduce couchette coaches on three international trains, from the Hook of Holland to Copenhagen and Salzburg, and from Amsterdam to Ventimiglia via Cologne. Previously, the only couchette coaches working into Holland have been those of the German and French railways from Munich and the French Riviera to Amsterdam. The Netherlands Railways are the sixth Continental administration to adopt couchettes, the other operators being the railways of France, Western Germany, Austria, Italy and Eastern Germany.

Publications Received

Gli Apparat Centrali a Leve Singole (Individual Lever Interlocking Frames). By C. Raselli (appendix by U. Alciati). Turin: Published by the author at Via Valpiana, 15. 9½ in. x 6½ in. 143 pages. Illustrated. No price stated.—This work is intended to guide the traffic staff in the use of individual lever type power frames, hydraulic and electric, and certain accessory equipment, treated in the appendix, met with in some power installations. These were developed many years ago to a high level of efficiency in Italy and many are in service there. Although relay type equipment is being used in most new work, the individual lever system must long retain its importance. A handbook dealing with its leading features, explaining the procedure to be followed when anything unusual occurs and the precautions required before allowing traffic to be carried on, is useful as a supplement to official rules and instruc-

tions. Although its value is largely restricted to those concerned with operating the particular apparatus in question, it is of interest to those outside Italy interested in following foreign practice and understanding how others meet problems facing signal engineers and traffic officers everywhere.

The Railroad. Because of the widespread abandonment of passenger train services in the U.S.A., there has grown up a generation many of whom have never travelled by train and some never even seen one. In response to repeated requests from teachers and students, the Atchison, Topeka & Santa Fe Railway system has produced a 32-page booklet, profusely illustrated, for distribution to schools. Entitled "The Railroad," it recounts the history and development of the Santa Fe and makes full use of the romance of the famed Santa Fe Trail. Designed for youth, it will interest and please many adults also, and should bring added prestige

to one of the largest and most profitable railroads in the country. Other railway systems are faced with similar problems and the way the Santa Fe has tackled it might well be studied and emulated. The booklet is obtainable on application to the head office of the railway, at 80, East Jackson Boulevard, Chicago, 4.

Klaxon Products.—Descriptive brochures describing products of Klaxon Limited, 49, Upper Brook Street, London, W.1. deals with items such as electric motors, geared motor units, industrial warning horns and sirens. Copies of these brochures can be obtained on application to the company.

Lead Acid Batteries.—A revised catalogue of 16 pages has been issued by C.A.V. Limited, Acton, London, W.3. It describes the range of batteries manufactured by the company, with particular reference to commercial vehicles; these include the armoured plate and light commercial types.

*Seventeenth International Railway Congress***Handling Less-than-Wagon-Load Consignments***Facilities and general arrangement of goods depots: palletisation problems*

QUESTION 5 on the agenda of the International Railway Congress Association at its Madrid session later this year, is concerned with aspects of smalls and parcels traffic: with handling facilities in depots, general arrangement of the depots, liaison between depots and delivery services, and the problem of introducing palletisation.

The reporter on the replies received from the "European" (Continental) group of railways is Monsieur M. Marchand, Division du Movement, French National Railways. Answers were received from a great variety of railways, ranging from large systems such as the German Federal and French National, to small concerns in the French colonies and to railways overseas which follow Continental (in this case French) practice, such as the Viet-Nam and the Djibouti to Addis Ababa Railways. Monsieur Marchand's report has been sent to us as translated into English from the original French text; the fact that the translation is far from clear adds to the difficulty of making a summary.

Less-than-wagon-load traffic is characterised by the fact that loading, unloading, and if necessary intermediate transshipments are carried out by staff of the railways or the forwarding agents acting for them. Certain administrations have fixed weight limits, but often such limits depend on the actual tariff conditions, which are intended to encourage clients to send their goods in full wagon loads as soon as the tonnage reaches a certain level.

The proportion of "smalls" and parcels traffic compared with the whole of the goods traffic varies very considerably on different railways; from 1 to 20 per cent, but these percentages may be greatly affected by the amount of traffic that is handled by forwarding agents. However, the answers show that the State railway administrations of Western Germany, Spain, Finland, France, Italy, Poland, Switzerland, and Yugoslavia, have an annual traffic of between 1,000,000 and 5,000,000 tons. The general tendency is for the value of the traffic to increase. Certain managements report, however, that this increase is slower than the progression of the national production index, so that it is probable that the increased traffic is largely enjoyed by competing methods of transport.

Traffic Organisation

Administrations of any size divide the system into regions each of which is served by feeder services. Each region has a centre for the transshipment of parcels and exchanging through wagons with other regional centres. In the case of some extensive railways

where it is not possible to exchange through services every day with all the other regional centres, variations to this organisation have been introduced which make use of intermediate transit centres at which the traffic to or from a varying number of regions is concentrated, according to the organisation.

All the administrations are taking steps on the one hand to reduce transshipment operations, and on the other hand to speed up such operations when they cannot be dispensed with. Services are marked out in the light of collection and delivery road services and wagon workings, taking into account the necessity to reduce transshipment to a minimum. These services are revised periodically to take into account the evolution of the traffic and optimum use of wagons.

Forwarding

The forwarding of consignments from acceptance to delivery are governed by two different principles; what Monsieur Marchand terms forwarding by labels, and forwarding by waybills.

Some managements limit the necessary information on the labels to the name of the destination station. This method simplifies labelling, but means that the staff handling packages must have a very extensive geographical knowledge of the system; others, in particular the Swiss Federal and to some extent the Belgian National Railways, indicate in code the exact route the package is to follow; yet others merely use a code to show on the label the destination of the package without any precision of the route to be followed.

No matter what labels are required, the method of forwarding packages by their labels makes it possible to speed up unloading at transshipment centres, as handling can begin as soon as the wagon arrives in the shed.

Other administrations, in particular the German Federal, Austrian Federal, and Danish State Railways, use waybills as the basis for consigning parcels. It is necessary that the waybills be sent at the same time as the packages, and even, if possible, by a faster route. Unless there is some direct way of forwarding the waybills, there must be a long enough period between the time limit for handing in consignments and the departure time of the wagons.

Rolling Stock

In general, the administrations use without distinction any covered goods wagons available. As large-capacity wagons are those in most demand, the railways often try to make use of the smaller vehicles for less-than-wagonload traffic. In Western Germany, Hungary, and Poland, covered wagons connected

by vestibule gangways are used, so that goods can be sorted during the run by travelling staff; but it appears that this is done only in the case of wagons allocated to feeder services.

Similarly, the Yugoslavian State Railways run trains composed of eight large vans connected by gangways. On certain lines this train collects and distributes packages at stations where there is not enough traffic to run through wagons. Sorting takes place en route.

Depots

At depots the connections with the sidings for the reception and dispatch of trains must be as simple and short as possible, and track arrangements and methods of working designed to simplify operation to the maximum extent. It is essential to reduce to the minimum delays between the arrival of the trains and the placing in position of the wagons, and between loading the last parcels and the departure of the trains.

The size of the depots depends not only on the tonnage handled, but also on the nature of the traffic to be dealt with. Account also must be taken of the incidence of seasonal and daily traffic peak.

As regards the area required in terms of the tonnage handled the opinions of managements vary according to whether they include the areas required for trolleying, but most administrations agree that a greater area is required for inwards than for outwards traffic of the same tonnage.

The loading and unloading of wagons and lorries must always take place at floor level. This is more important in the case of heavy packages, especially when containers and pallets are used. The differences in level between platform and wagon are made good by mobile steel, light metal, or wood bridges. It is considered advisable to fit such bridges with some device to prevent them slipping when containers on wheels, fork-lift trucks or pallet-holders are used. Between platform and lorry, where the difference in level may be much greater, the difficulties are solved by using extensive loading bridges on hydraulic jacks.

In depots without platforms, the S.N.C.F. uses, for the transport of parcels, trailers of which the floor level corresponds with that of the wagon floors, taking into account the level of the yard compared with the rails; these trailers are in fact mobile platforms.

Resort to serving a platform from a track which is not adjacent to it by passing through wagons on the adjoining track, is only made exceptionally because of the insufficiency of certain installations. In the opinion of all managements, the placing of the wagon

into position so that all the doors will correspond on two adjacent tracks wastes much time. The bridges used must be very strong; they are difficult to handle and are a serious accident risk. The German Federal, Belgian National, and the Danish State Railways make it clear that they forbid such bridges to be used with fork-lift trucks.

Door to Door Delivery

Certain administrations, in particular the S.N.C.B. and the S.N.C.F., deliver goods to the premises of the receiver without other formality, unless asked not to. The overall area to be reserved for arrivals to be delivered to premises is greater than that reserved for arrivals to be held at the station, which are in the minority.

In general, the part of the depot reserved for delivery to premises is divided up into as many bays as there are delivery zones, each bay being served by a door in front of which the lorry for the area parks. The bays are perpendicular to the lorry parking space.

There is another method in which no distinction is made between consignments arriving for delivery to premises or for the station. The packages are stacked in whatever space is available when they are unloaded. The depot is then divided into a certain number of numbered bays in which the parcels are stacked, the number of each bay being entered on the corresponding waybills.

This method presupposes in particular that the waybills come in at least at the same time as the parcels, as they have to be checked against the parcels when these are unloaded. It is used in particular in the palletised depots of the Swiss Federal and on the Bas Congo-Katanga Railways.

Arrangements of Bays in Depots

Most administrations provide special bays in the part of the depot reserved for arrivals to be collected for each of the important hauliers, where the parcels are stacked without being arranged according to destination, and for certain consignors who receive a large tonnage every day.

The bays in this case are marked by painted letters on the floor and name plates. Parcels for customers who only collect a small tonnage or occasional customers are put in special bays.

As regards storage facilities, only the Swiss Federal Railways, whose parcels traffic is completely palletised, use metal racks for pallets wherever there is a shortage of space. The German Federal Railway intends to experiment with such equipment in the near future. Other administrations report the use of racks for small parcels or foodstuffs. Special closed premises can be provided for surplus parcels, and spoilt or damaged goods.

When customers arrive at the depot with a consignment, an employee of the railway checks the parcels, notes the weights, marks, and numbers, compares these with the waybill, and also checks that they are properly packed.

In the case of administrations which

do not use consigning labels, the railway staff check that the label put on by the consignor includes all the necessary particulars. In other countries, they prepare and fasten on the label. In a station with little traffic, the package is most often taken directly to the wagon according to its label, but as soon as there is a certain level of traffic, it is no longer possible to take each consignment separately to the outwards wagon and it may be an advantage to send consignments through a sorting centre where they are grouped together in units for handling according to destination, on trucks, trolleys or pallets.

Loading in Wagons

In certain cases the loading sidings may not be of sufficient capacity to place all the different wagons simultaneously; or some loading may have to be done with a special arrangement of the packages, for example, the heavy parcels and bulky ones at the bottom of the wagon, the light ones above, foodstuffs near the doors, or arranged according to destination if there are several different consignments in the load.

In these circumstances it is necessary to store the parcels between the sorting centre and the wagons.

The German Federal, Swiss Federal, and French National Railways report that they use special gangs of loaders who supervise the loading of the wagons to consolidate the loads, by means of wedges, anti-shock mattresses, dunnage, and other devices. Great importance is attached to these as a means of keeping claims to the minimum.

Conveyor Belts

The German Federal Railway states that it has stopped using conveyor belts because of the increase in the number of small containers now used, and, more important, of the increasing adoption of palletisation. It considers that the use of elevator trucks and working with tractor-drawn trolleys is often more flexible and more economic than working with conveyor belts.

The use of both these methods whose functions would in part overlap, would have resulted in neither of them being fully utilised, and the platforms would have had to be abnormally wide.

The S.N.C.F. also states that conveyor belts intended for transport over a long distance as well as the terminal distribution alongside the wagons or lorries are costly to instal and operate, because in the distribution zone it is necessary to have a fairly large number of employees to take off the parcels at the right places.

It would appear that the same reasons have led some railways to stop using mechanical chain conveyors. The German Federal Railway stresses the fact that with the conveyor chain, besides the above-mentioned difficulties there is the necessity for fitting all the small containers with additional devices to enable them to be hooked

on to the chain. Although it appears that the conveyor belt should not be retained for its function of transporting packages between the arrival and departure platforms, it is still of value for sorting consignments on arrival. For this purpose it is used in the depots without platforms for a preliminary sorting, which, followed by distribution makes it possible to get a flow of goods towards a large number of destinations.

Palletised Traffic

The administrations which have palletised their smalls traffic are using pallet-carriers and elevated trucks, and sometimes, for transport over long distances, trucks hauled by tractor.

Certain countries, Germany and France in particular, prefer bogie type pallet-carriers which cope more successfully with irregularities in the ground, or floor of wagons; others, Switzerland for example, prefer simple rollers which reduce the resistance on curves.

All administrations state that they are satisfied with the material they have chosen, although to begin with certain difficulties occurred caused by defects in the oil pumps used in the pallet lifts. It is recommended to fit an overload valve on the elevator cylinder to avoid damage when the maximum load has been exceeded. Annual maintenance costs are, in general, low and do not exceed 5 per cent of the cost price; the amount of damage occurring depends largely on proper supervision and care of the machines.

Fork-Lift Trucks

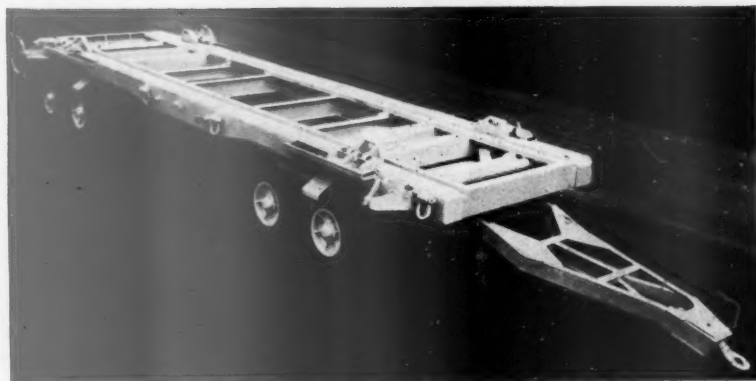
The fork-lift trucks are intended primarily to pile up and unload goods, and they make it possible to transport pallets and heavy parcels over average distances. Their use is combined with that of hauled trucks as soon as the distances increase, without the various users having explained the exact regulations in force. It appears that in the case of pallets which are not stacked together, the unloading of the wagons takes place quicker if the pallets are taken out by pallet carriers than by fork-lift truck.

The introduction of palletisation is in most cases still too recent for the administrations to have been able to draw up accurate balance sheets. Only the Swiss Federal Railways, whose experience is the most comprehensive, were able to draw up a balance sheet based on operating results. It gives the profit on the capital invested at 15 per cent. This balance sheet only takes into account the direct advantages of palletisation on which it is possible to put a figure, such as saving in staff due to the speeding up in the handling.

In general the administrations who have some experience of palletisation are agreed that in addition to the direct economic value which guarantees a high return from the capital invested, the use of pallets results in an appreciable reduction in damage during transport; increase in transport potential; and a reduction in staff fatigue.

Trailer for Inter-Works Transport

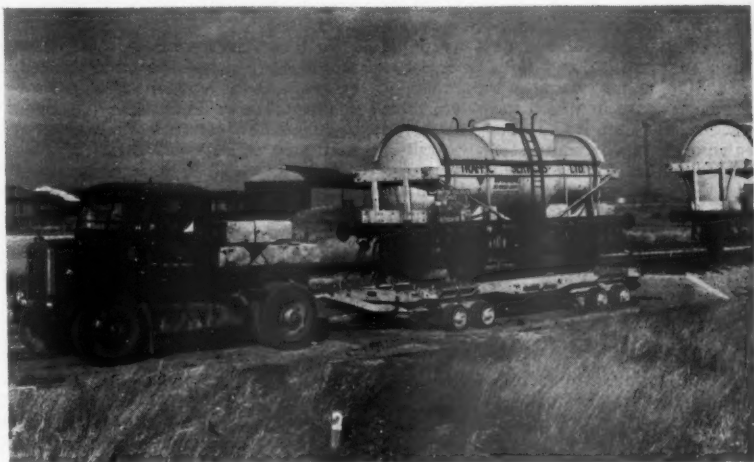
Special arrangements for road haulage of rail tank wagons conveying inflammable gas



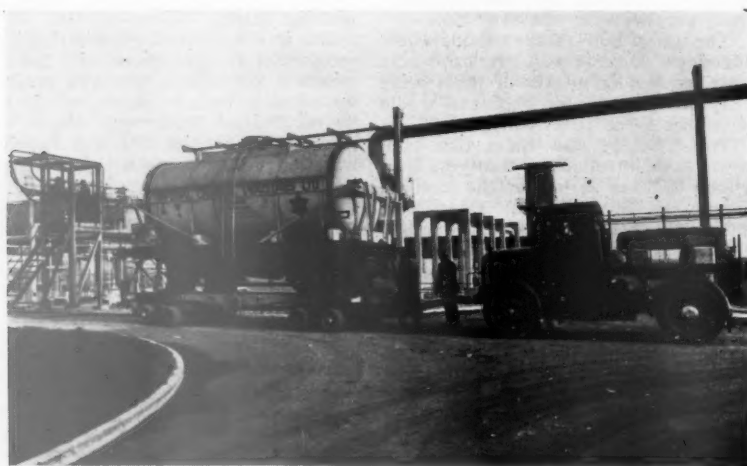
Solid-tyre 32-wheel trailer for inter-works transport of tank wagons

ALTHOUGH familiar in Germany, where it is termed *Strassenroller*, the wagon transporter has not been used to any great extent in this country. Recently, however, its use has been developed at the Wilton (Middlesbrough) works of Imperial Chemical Industries Limited to overcome the problem of moving safely and efficiently a highly inflammable gas from its loading point to the nearest "railhead" within the works.

A number of reasons led up to the design of the special trailer. Movement of the gas, butadiene, which is used in the manufacture of synthetic rubber, to the Continent by road was precluded, as the Ministry of Transport shipping regulations did not permit vehicles conveying the gas to cross the Channel by the normal passenger-carrying road-vehicle ferry service. Had road transport been possible no problems would have arisen.



Trailer with rail tank wagon being towed away from railhead



Tractor pushing tank and trailer into butadiene loading plant

The butadiene plant is not rail served. Not only would it have been uneconomical to connect the works sidings to the plant, but also the need for safety precluded the use of a locomotive in the restricted area in which the plant lies. For the same reasons a pipeline run out from the plant to the existing railhead was not considered a safe or practicable proposition, as neither was the transfer of the chemical from road tanker to rail tanker at the railhead.

Solid-Tyre Trailer

The solution has been a 35-ton capacity unsprung 32-wheel solid-tyre trailer, eight wheels per axle, to the main frame members of which "rails" for the wagons are incorporated, built by R. A. Dyson & Co. Ltd. of Liverpool.

The trailer is 24 ft. 2 in. long by 8 ft. 9 in. wide over the tyres; the platform height is 2 ft. 7 in., coinciding with the height of rail at the transfer point. The chassis of the trailer consists of two heavy box section main frame members set at 4 ft. 8½ in. apart, forming the guides to receive the wheels of wagons. Forecarriages are fitted at each end of the trailer, each being fitted with four short oscillating axles. A hand steering device is operated from either side of the trailer on each bogie, together with balancer beams for maximum oscillation.

The axles are equipped with heavy-duty Timken roller bearings; special hubs with steel disc wheels and 20 in. x 5 in. x 14 in. twin solid tyres are fitted.

Brakes are fitted to each of the two sets of leading and trailing wheels, mechanically operated by a hand park-

(Continued on page 570)

Test Results of the Deltic Locomotive

Traffic and efficiency data from the application of a 3,300-b.h.p. diesel-electric locomotive to British trains



The Deltic locomotive on Runcorn viaduct on an up Liverpool-Euston express

IN the summer of 1956, some nine months or so after its completion, the 3,300 b.h.p. Deltic diesel-electric locomotive, still the property of English Electric, was given a series of trials on British Railways, first with the three cars of the mobile testing unit, and then with a dynamometer car on a 20-coach train of passenger stock. Only now have the test results been made open, with the publication of British Railways Test Bulletin No. 19.

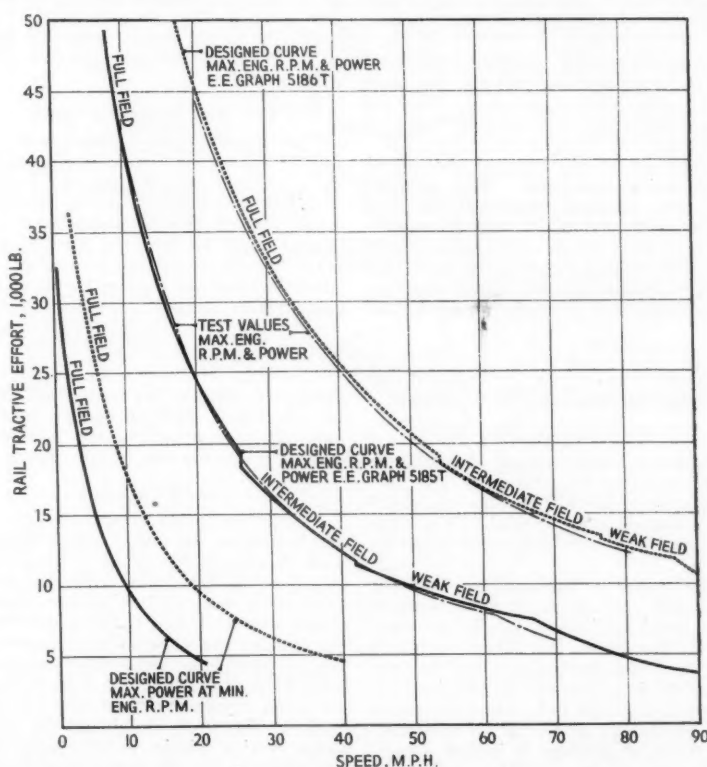
The Deltic is a Co-Co locomotive of 106 tons weight with a designed maximum tractive effort of 52,500 lb., that is, equal to a factor of adhesion of 4.25. Top designed speed is over 100 m.p.h., and continuous rated tractive effort 29,000 lb. at 35 m.p.h. Power comes from two Napier Deltic triangular three-crankshaft engines, with a set maximum of 1,650 b.h.p. per engine at 1,500 r.p.m. Altogether each engine has 18 cylinders in three banks, and these are of opposed-piston two-stroke form. Each engine drives a six-pole generator having a continuous rating of 1,100 kW. at 1,500 r.p.m. and a maximum current of 3,000 A.; the two generators are connected in series. A 45-kW. auxiliary generator is gear-driven at a top speed of 2,250 r.p.m. from each main machine. Six nose-suspended traction motors, with an individual continuous rating of 400 h.p., 533 A., 600 V., are connected three pairs in parallel across the main supply, and they drive the 43-in. wheels through 21:59 gears. Forced ventilation is utilised, from four motor-blower groups. Fuel oil used during the tests was normally of 19,540 B.Th.U. per lb. gross calorific value.

Two-Engine Power Outputs

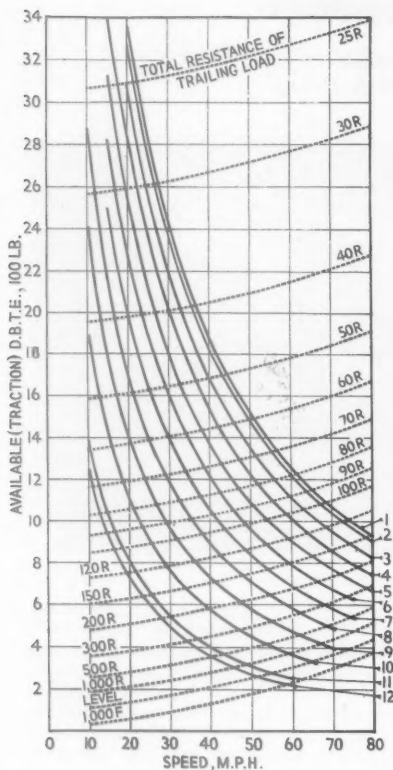
Under the conditions of both engines running, a series of speed-drawbar pull curves were drawn up from the testing unit trials, and from a dozen different engine h.p. outputs; and the topmost

curve, at 3,250 b.h.p., shows values well up to what might be expected from a consideration of the designed speed-tractive effort curves related to the wheel rims as shown in the first of the accompanying diagrams. A maximum drawbar pull of 44,000 lb. is shown in the recorded speed-tractive effort charts,

and this was available at speeds up to 20 m.p.h. with the engines developing a total of 3,250 lb.; but the text of the report mentions that a pull of 45,550 lb. was sustained for two minutes without slipping, equal to 19 per cent adhesion. At 80 m.p.h. under full load the drawbar pull was 10,800 lb., that is 2,300



Deltic locomotive designed and service tractive effort curves for one and two engines



Horsepower settings thus: 1, 3250; 2, 3180; 3, 2925; 4, 2660; 5, 2395; 6, 2120; 7, 1856; 8, 1588; 9, 1312; 10, 1038; 11, 764; 12, 696. Gradient curves represent 1 in the number given; R, rising and F, falling

Performance and traction efficiency with two engines and 300-ton passenger train

d.b.h.p., or 71 per cent of the actual b.h.p. being developed. This pointers the low running resistance of this smoothly-shaped locomotive; from 4 lb. a ton at 10 m.p.h. it rose only to 15 lb. a ton at 80 m.p.h., no more than that of a standard coach. Corresponding curves of d.b.h.p. made up from the

drawbar pull and speed curves shows the speed of the peak d.b.h.p. to rise almost in a straight line as engine output advances: from 490 b.d.h.p. at 24 m.p.h. with 696 engine b.h.p. to 2,580 d.b.h.p. at 42 m.p.h. from 3,250 engine b.h.p. At 2,580 d.b.h.p. the thermal efficiency at the drawbar was 27½ per cent.

Consumption and Efficiency

Fuel consumption curves on the basis of lb. per d.b.h.p.hr. against constant track speed and varying outputs show good and reasonably even results, and indicating that the engines' own specific fuel consumption curves are of good shape. But another interesting family of curves is the division of power loss between the engine crankshaft and the drawbar. Under full load, and at the point of optimum d.b. output at a speed of 42 m.p.h., the efficiency through the electric transmission including gearing is shown by these curves to be almost 86 per cent, and at 80 m.p.h. about 84 per cent, though in part these are calculated values and not fully measured throughout. Power absorption by auxiliaries was of the order of 150/160 h.p. At approximately half and two-thirds full load the transmission efficiency was also about 84 per cent at 40 m.p.h., and it is in these two power ranges that a 3,300-b.h.p. locomotive in England must generally work. Under about half load, 1,588 b.h.p. to be exact, the fuel consumption from 10 up to 70 m.p.h. averaged 600 lb. an hour. Per d.b.h.p. the optimum value was 0.475 lb. at 40 m.p.h. and full load, to 0.575 lb. at 80 m.p.h. and two-thirds of full load.

Test with Passenger Stock

The comprehensive tests with the mobile testing unit were supplemented by a test run from Carlisle to Skipton with 642 tons trailing load of passenger stock including a dynamometer car; and as might be expected the d.b. pulls here did not reach the values of the controlled testing; but up the 1 in 100 grades approaching Ais Gill summit

d.b.h.p.s of 2,200 to 2,300 were recorded at 45 to 55 m.p.h. A feature of this run, despite the load, was the rapid increase in speed over each length of easier gradient. Another was the constant variation in d.b.h.p. on steady gradients, showing that each item such as large-radius curves and shallow cuttings, had measurable effect on the train resistance.

Haulage Capabilities

Finally, haulage charts were drawn up from the mobile testing unit and dynamometer car road tests, and related to fuel consumption these showed economy in all the high-power and high tractive effort belts. Working under full power, a 500-ton passenger train can be hauled up a 1 in 100 gradient at 50 m.p.h., and up 1 in 75 (say Shap) at 41 m.p.h. With this load the top test speed of 80 m.p.h. could be maintained up a 1 in 400 gradient. If used on light fast trains of, say, nine coaches and 300 tons weight, then the speed up 1 in 75 could be up to 58 m.p.h., or 80 m.p.h. up 1 in 150. Naturally it is in these high-power performances that the Deltic locomotive is shown by the reports to be attractive, for under present schedules and 11-car or 12-car trains around 400 tons the power requirements are much less, even 60 m.p.h. up to Tring on the L.M. Region not calling for more than 1,125 d.b.h.p., which would be just within the capacity of the Delta locomotive with only one of the two engines working, though of course this one would be under full load. Tests with one engine of the two working under full load of course showed less than half the drawbar output with the two engines working flat out, because locomotive resistance, and also auxiliary power requirements, absorb a greater proportion of the engine b.h.p., and also traction motor efficiencies are rather less because of their operation at half the voltage. The same maximum drawbar tractive effort of about 44,000 lb. can be obtained with one engine, but only up to 8 m.p.h. or so.

Trailer for Inter-Works Transport

(Concluded from page 568)

ing brake on each carriage. Each hand-brake operates the brakes on the four wheels fitted to the carriage to which the handbrake is applied. The two carriages are inter-connected with tie bar.

The trailer is designed so that the front and rear carriages have a maximum restricted lock of 30 deg. on each side of the centre line when operating with the hand steering gear and tie bar. A full 90 deg. lock can be obtained on the front carriage only when the hand gear wheels and the tie bar are removed, and the rear carriage is locked into a permanent position. The ends are identical, so that a wagon can be turned in relation to the siding if required.

Adjustable steadying legs are also

fitted to the end of the trailer, but these are not being used for present operations as a permanent "steady" platform is built up at the end of the siding.

Use of Chocks

Before an empty tank wagon is shunted on to the trailer robust hinged steel chocks on the front carriage are swung on to the trailer rails; identical chocks are secured behind the wagon wheels when it has been transferred. The chocks are capable of adjustment to accommodate wheelbases ranging from 11 ft. 2 in. to 15 ft. 2 in. to suit the various types of wagon used for this service. The gross weight of the tank wagon varies within a few tons, the maximum being 37 tons. The tanks are heavily lagged, and the maximum capacity of butadiene is 11 tons. As an additional safety precaution, the tanker

is further secured to the trailer by bracings at each of the four corners.

A heavy-duty drawbar is secured for towing, in this case by a four-wheel Scammell tractor; the latter is equipped for this operation with a special weighted frame to give the rear wheels the necessary adhesion. This frame can be easily lifted off by a crane when the tractor is required for other purposes.

The Scammell-Dyson combination travels at an average speed of 5 m.p.h. For the last 50 yd. of its journey to the butadiene loading point the tractor is detached from the trailer, turned round and connected nose-first. It then pushes the trailer backwards to the loading point. At this stage, the tractor normally leaves the trailer and tank wagon to be loaded, and it is then available for other duties around the works.

Construction of Stockholm Underground Central Link

Freezing used to stabilise underwater clay and special rock-boring methods

THE Central Section of the Stockholm Underground Railway, under construction since November, 1951, was completed beneath the centre of the city to connect the Western and Southern Sections. It runs from Hörtorget (Kungsgatan) through Centralen and thence parallel to the State Railways main line via Gamla Stan to Slussen. Though only 1.3 miles long this section is by far the most important of the existing 18½-mile and still rapidly-expanding system. It makes possible through running from Hässelby and Vällingby in the west to Hökarängen and Högdalen in the south.

Four Tracks

That so short a length of line, even though entirely underground and built mostly for four tracks, should have taken so long to construct is accounted for mainly by the extremely difficult conditions that had to be faced by the engineers. The section is almost all below ground water level, and the soil

conditions varied from hard rock, treacherous shale, and shattered rock to soft underwater clay. For it passes under the Norrström, the outlet channel from Lake Mälaren to the Baltic Sea; at one point the tunnelling was flooded and part of it collapsed. The reason for virtually all the tunnelling being designed to accommodate four tracks is explained in an editorial in this issue.

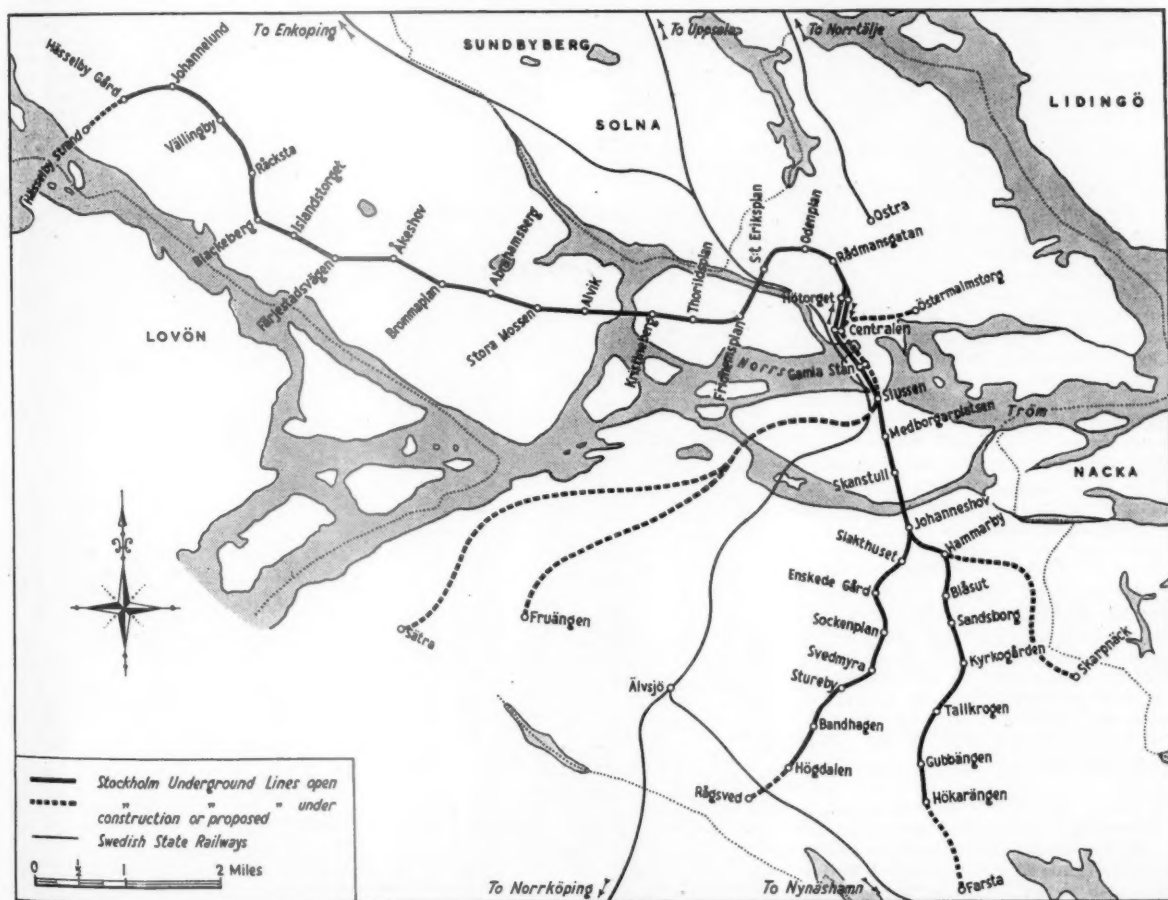
At Centralen station excavation was in solid gneiss and some granite, rocks so impervious to water after grouting that no tunnel-lining was necessary, even though heading-bottom was about 33 ft. below sea level and the rock was quite near the Norrström channel. It was therefore decided to make a single large and nearly square bore to accommodate the four tracks at two levels one pair immediately above the other.

Underwater Tunnel

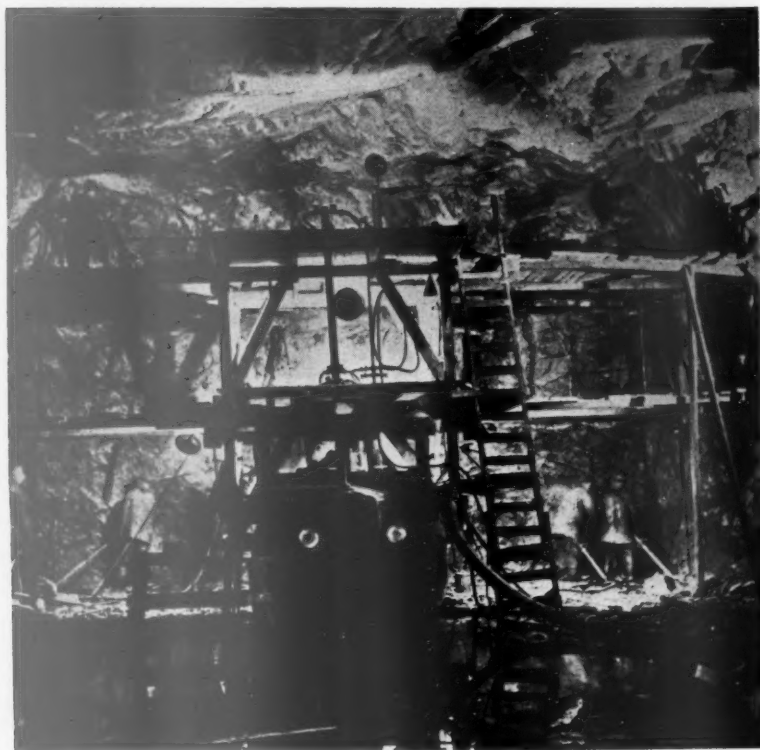
Southwards from Centralen the tunnel dips down to pass under the Norrström, and here the rock dips

even more rapidly to a depth of 82 ft. It is overlaid with soft clay, and conditions for tunnelling under the channel were therefore extremely hazardous. The position was further complicated by the proximity of the State Railways southern line. After careful investigation it was decided to sink three caissons in the clay. To stabilise the surrounding soil refrigerating tubes were used to freeze pillars of earth about 3 ft. in dia.

The freezing process was adjusted to insure maximum stability at critical points during sinking; 200-ton jacks mounted on steel piles were used to keep the caissons straight. When the caissons had sunk to their final positions, underpinning was used to reinforce and consolidate the structure. Here the four tracks are at the same level and are enclosed in a single concrete tunnel, specially heavily designed so as to resist any tendency towards floating upwards. It is insulated with asphalt and polyisobutylene. On-



Map showing the underground railway system in Stockholm and its extensions under construction or proposed



Rock-drilling frame mounted on bus chassis for constructing a four-track station tunnel at two levels

wards towards Slussen the tracks rise to street or higher level.

In general, the cross-sectional areas of the tunnels in rock are: for single line, 350 sq. ft. double line, 690 sq. ft.; and station tunnels 1,150 sq. ft. there are also ventilation, escalator, storage and subway tunnels. Since 1945 the special Swedish method has been adopted for drilling. It uses an Atlas-Copco light-weight pusher fed tungsten-carbide-tipped type of drill working from a light movable platform, mounted on a lorry chassis. The platform frame is designed normally for single-line tunnelling, but also has extendible side arms, enabling double-line tunnels up to 34 ft. wide to be drilled without undue difficulty.

Two-level Tunnels

For two-level tunnels on this line a special double-deck carriage was built on a bus chassis with side arms extendible for tunnelling to 38 ft. in width. Electric detonators with a time-delay of up to 95 sec. were used, and, since 1953, milli-sec. blasting has been the rule, reducing vibration and giving better fragmentation.

Mucking

Mucking in single-line tunnels is with a mobile scraper-ramp with a 34-h.p. dragline and a 1.2-m. scraper and a Holcomb bucket. To scrape together the muck after blasting and enable the scraper to get working quickly a diesel

tractor fitted with a dozer blade was found very useful. This tractor also

moved the dragline equipment from one tunnel to another. In the two-level tunnels mucking was done with an excavator having a short dipstick and buckets of from 17 cu. ft. to 21 cu. ft. capacity.

Station Décor

The stations walls are glazed with tiles of various colours, and illumination is with fluorescent tubes. At Centralen station there is special decoration in the form of a glass mosaic of a new and unique kind arranged to give the impression of glittering flowing water.

Construction work was carried out under the Public Works Office in close collaboration with the Stockholm Transport Company which operates the Underground system.

SCOTTISH REGION RAILWAY FIRE FIGHTING COMPETITION.—The Scottish Region annual competition for efficiency in fire fighting was held on May 6 at the North West Fire Station, Glasgow. There were contests in two-man extinguisher drill, three-man hydrant drill and five-man trailer pump drill. Teams of railwaymen from all parts of Scotland took part. The winners were as follows:—Two-man extinguisher contest, Thornton Motive Power Depot; three-man hydrant contest, Barassie Wagon Works; five-man trailer pump contest, Haymarket Motive Power Depot, Edinburgh. Prizes were presented by Sir John Denholm, member of the Scottish Area Board. The winning teams in each event will represent the Scottish Region in the Inter-Regional Competition to be held in London on June 3.



Two-level four-track tunnel under construction in the centre of Stockholm

RAILWAY NEWS SECTION

PERSONAL

Mr. F. A. Dadge, Assistant Railway Accountant, Finance Department, British Transport Commission headquarters, has been appointed Regional Accountant, Designate, North Eastern Region, British Railways. The appointment follows a decision to establish separate Regional Account's Departments for the Eastern and North Eastern Regions.

moved to Scotland in 1945 as District Superintendent, Burntisland. In 1946 he became Assistant Superintendent of the Scottish Area, L.N.E.R., and, in 1949, was appointed Assistant Operating Superintendent, British Railways. He became Chief Operating Superintendent Scottish Region in 1955. He was made an M.B.E. in 1943.

Mr. D. C. Baijal, who, as recorded in our April 11 issue, has been appointed

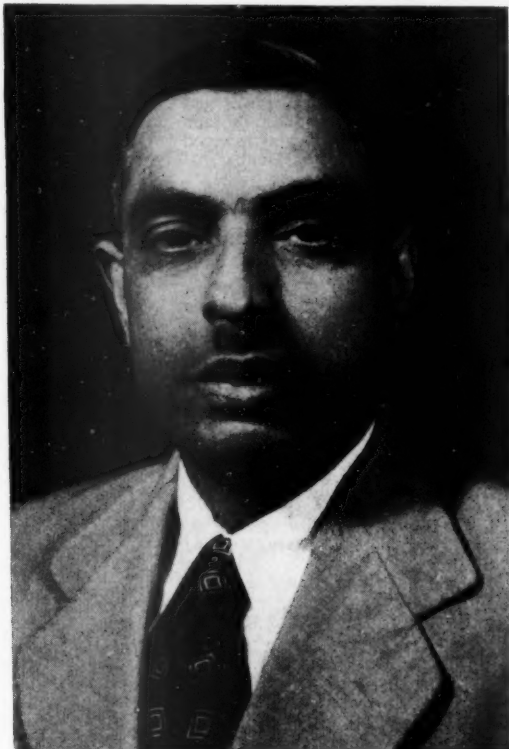
Bridge Enquiry Committee. On completion of this work, he resumed duty as Joint Director, Civil Engineering. In October, 1952, he became Divisional Superintendent of the Jodhpur Division of the Northern Railway.

We regret to record the death, on May 8, of Mr. P. F. Maflin, O.B.E., M.C., former Member of the Indian Railway Board. Mr. Maflin received his technical



Mr. F. C. Margetts

Appointed Assistant General Manager (Traffic), North Eastern Region



Mr. D. C. Baijal

Appointed General Manager, North Eastern Frontier Railway of India

Mr. Frederick Chilton Margetts, M.B.E., who, as reported in our May 2 issue, has been appointed Assistant General Manager (Traffic), North Eastern Region, British Railways, joined the service of the London & North Eastern Railway in 1923, and after gaining experience at various stations, became a Traffic Apprentice through competitive examination in 1927. After experience in staff work, and particularly in connection with the introduction of incentive schemes, he was appointed to the position of Assistant Goods Agent at Monkwearmouth in 1936. Two years later he became head of the Trains Section of the Locomotive Running Superintendent's Office at York, a position he vacated towards the end of that year to take charge of the Joint Freight Trains Section, under the direction of the Superintendent & Locomotive Running Superintendent of the North Eastern Area. Mr. Margetts went to the Southern Area of the L.N.E.R. in 1943 as Trains Assistant to the Operating Superintendent, and

General Manager of the recently-inaugurated North Eastern Frontier Railway of India, was born on August 8, 1906. After graduation as a B.Sc. from Allahabad University, he joined the Thomason College of Civil Engineering, Roorkee, in 1926. In 1929 he was awarded the Council of India Prize for the most distinguished student of the year. He joined the Indian Railway Service of Engineers in 1930 and was posted as Assistant Executive Engineer on the Eastern Bengal Railway. After service as a sub-divisional officer in Assam, North Bengal, and East Bihar, he became Executive Engineer, Calcutta District, in 1941. He joined the Defence of India Corps (Railways) as a commissioned officer in 1942 and, on resigning in 1946, was awarded the honorary rank of Major and the Burma Star, 1939-45 Star, and War Medal. In 1946, he was transferred to the Railway Board as a Deputy Director (Projects), and, in 1947, became Joint Director, Civil Engineering. In 1952, he was appointed Secretary of the Ganga

training at the Royal Indian Engineering College, Coopers Hill, and began his career as an Assistant Engineer in the Railway Branch of the Public Works Department in 1907. He was posted to the North-Western Railway. In 1912 he acted as Executive Engineer in charge of the construction of the Jumna Bridge, and was confirmed in that position in 1915. He was commissioned in the Royal Engineers and from 1916 to 1920 served in East Africa and on the North West Frontier. He was mentioned in despatches three times and received two decorations, including the M.C. From 1920 to 1923 he was employed on the North Western Railway, first as Superintendent of the Kalabagh-Bannu Railway, and later in the Agent's office. In 1923 Mr. Maflin was appointed Deputy Director of Projects, Railway Board, and a year later became Secretary, Railway Board. After special duty during 1927-28 in connection with the proposed broad-gauge Agra-Karachi line he again became Secretary to the Rail-

way Board, the position he held until April, 1929. He was then appointed Agent, Eastern Bengal Railway and from 1930 to 1933 officiated as a Member of the Railway Board. In March, 1931, he was appointed Agent, Nizam's State Railway, the position from which he retired in 1936. On his return to the United Kingdom, Mr. Maflin served as a director on the home boards of several Indian Railway companies. Recently he was concerned in negotiations with the Secretary of State for Commonwealth Relations regarding the improvement of pensions and conditions of retired officers of the Indian Railways, and other Government services. Mr. Maflin was awarded the O.B.E. in 1920.

In the biography of Mr. A. R. Dunbar, published in our May 2 issue, we stated that he gained the Institute of Transport Award for a paper entitled "The problem of passenger transport in small towns and rural districts." The paper was, in fact, read by Mr. C. S. Dunbar, who received the award, and not Mr. A. R. Dunbar.

Mr. R. W. Coatesworth has been appointed Assistant Estate & Rating Surveyor, York, North Eastern Region, British Railways.

Mr. T. R. Chapelhow, District Operating Superintendent, Rugby, London Midland Region, British Railways, has been appointed the first District Operating Superintendent of the newly-formed Operating District of Manchester (North).

Mr. L. J. Quilter, Assistant Traffic Manager, Eastern National Omnibus Co. Ltd., Chelmsford, has been appointed Traffic Manager of that company. He succeeds Mr. F. Bryan, who is retiring.

Mr. C. L. Smith, Assistant Estate & Rating Surveyor, North Eastern Region, British Railways, who, as recorded in our April 4 issue, has been appointed Estate & Rating Surveyor of that Region, began his railway career with the Southern Railway at London Bridge in 1925. He occupied various positions in the Estate & Rating Department, before being appointed, in 1949, District Surveyor (Western District), Southern Region. In 1951, he was appointed Assistant Estate Surveyor, North Eastern Region, and in 1956 became Assistant Estate & Rating Surveyor, North Eastern Region. He is a Fellow of the Royal Institution of Chartered Surveyors. Mr. Smith is Chairman of the North Eastern Regional Council of the British Railways Staff Association.

We regret to record the death of Mr. K. N. Eckhard, M.I.E.E., M.I.Loco.E., M.Inst.T., former Chief Electrical Engineer, General Mitre Railway, Argentina. Mr. Eckhard served as a pupil with Spagnoletti Limited and later became an apprentice with London United Tramways. In 1909 he joined the London Electric Railways. In 1913 he joined the Central Argentine Railway, then engaged on suburban electrification. In 1920 he was appointed Resident Engineer in charge of the Electrification Section, C.M.E. Department. When that section became a separate department in 1926, he was appointed Chief Electrical Engineer. He was also responsible for the maintenance of diesel railcars. In 1945 he was a member of the Motive Power Committee sent to the U.S.A. and Europe to investigate the latest developments in diesel-electric traction. Mr. Eckhard retired as Chief Electrical Engineer, General Mitre Railway, in 1949. He joined the board of Brush Bagnall

Traction Limited as Director and General Manager.

Mr. P. Scott-Bennet, Signal Engineer, North Eastern Railway of India, has been appointed Chief Signals and Telecommunications Engineer of that system.

Mr. G. F. Brown, Chief Mechanical Engineer, Victorian Government Railways, has been appointed a Commissioner of that system.

Mr. J. G. Smith has been appointed a Deputy Chief Engineer (Civil Engineering), Highways Engineering Staff, of the Ministry of Transport & Civil Aviation.

Mr. D. W. MacDougall, Head of the Passenger Division, Audit Accountant's Office, Glasgow, Scottish Region, British Railways, has been appointed Assistant to the Regional Accountant (Audit), Scottish Region, Glasgow.

THE LATE MR. W. P. ALLEN

The funeral of Mr. W. P. Allen, late Manpower Adviser to the British Transport Commission, was held on May 9, at Golders Green Crematorium. The Rev. H. J. Halsey officiated, and Sir John Benstead, Deputy Chairman, British Transport Commission, gave an address in tribute.

In addition to family mourners, the following attended:—

British Transport Commission

Sir Brian Robertson, Sir J. Landale Train, Messrs. A. B. B. Valentine, J. W. Watkins, Sir Reginald Wilson, Mr. R. F. Hanks, Sir Michael Barrington-Ward, Maj.-Gen. L. Wansbrough-Jones, Messrs. S. B. Taylor, H. E. Osborn, M. H. B. Gilmour, J. H. Brebner, N. E. Hedger (representing Mr. A. J. Pearson), J. L. Webster, J. L. Harrington, A. R. Dunbar (also representing Mr. H. A. Short), C. H. Brazier, L. J. H. Hamblin, J. P. Mead, J. E. M. Roberts, E. J. Larkin, G. H. K. Lund, D. Robertson, R. Byron-Scott, Miss G. E. R. Phillips, Messrs. F. R. Stockdill, W. Harris-Burland, E. P. J. Lurch, D. M. Dear, C. H. Lott, W. S. Morgan, L. W. Orchard, D. W. Glassborow (also representing Mr. W. I. Winchester), N. R. Bellwood, D. W. Aldred, W. S. Barnes, Col. N. McK. Jesper, Messrs. A. C. Edmonstone (also representing Mr. C. C. Inglis), E. J. Card (also representing Mr. R. B. Hoff), F. J. Paterson, E. Anstey, Dr. F. C. Curtis.

Messrs. E. A. W. Dickson (also representing Mr. F. Grundy and Mr. A. A. Harrison), E. J. Vipond, R. Thompson, R. C. Bond, E. S. Cox, J. S. Campbell (also representing Mr. J. Ratter and Mr. C. W. King), D. L. G. Pamplin (also representing Mr. T. M. Herbert), G. Morton, J. Haworth, J. E. Binks, John Ryan.

Eastern Region

Messrs. H. C. Johnson, A. J. White, S. G. Hearn, C. S. McLeod, Dr. J. Sharp Grant.

London Midland Region

Messrs. David Blee, E. W. Arkle, H. Aidley.

North Eastern Region

Mr. S. J. Judson.

Scottish Region

Mr. D. F. Gowen (also representing Mr. J. Ness).

Southern Region

Messrs. D. McKenna (also representing Mr. C. P. Hopkins), H. C. Lang, Dr. R. N. E. Watt (also representing Dr. L. J. Haydon).

Western Region

Messrs. K. W. C. Grand, S. G. Ward, P. Armstrong.

British Road Services

Maj.-Gen. G. N. Russell, Messrs. H. E. Clay, E. G. Marsden.

British Transport Docks

Sir Robert Letch, Mr. F. J. Norris.

British Transport Waterways

Maj.-Gen. Sir H. Reginald Kerr, Mr. W. L. Ives.

Tilling Group

Mr. F. P. Arnold.

B.T.C. Hotels & Catering Services

Messrs. F. G. Hole, D. A. Campbell (also representing Mr. H. G. B. Kelley).

London Transport Executive

Messrs. A. H. Grainger, A. Bull, J. Cliff. Sir John Elliot was unable to attend, owing to a family bereavement.

Ministry of Transport & Civil Aviation

Mr. R. R. Goodison and Brigadier C. A. Langley (both also representing Sir Gilmour Jenkins).

Trades Union Council

Sir Tom O'Brien, Mr. G. Woodcock.

Trades Unions

Messrs. A. L. Castleman, W. R. Davies, P. St. L. Lloyd, C. W. Evans, S. F. Greene, F. Lane, J. G. Hallett, J. Lawrence, A. Hallworth, W. J. Evans, W. J. Cleaver, W. J. P. Webber, A. Sams, — Parry, G. B. Thorneycroft, C. Prescott, H. G. Barratt.

Also present

Mr. Walter Monslow, Dr. E. R. O. Merryweather, Mrs. L. Hunt, Messrs. T. G. Hughes, N. J. M. Robertson, G. R. D. Brumdon, T. Tritton (representing Mr. B. W. C. Cooke).

Mr. L. H. K. Neil, who retired last October as Continental Traffic & Shipping Manager, Eastern Region, British Railways, was the guest of honour, in Brussels on April 29, at a luncheon following the Annual General Meeting of the Société Belgo-Anglaise des Ferry-Boats. Mr. Neil was a British Transport Commission nominee director of the Belgian Company and was its Vice-Chairman. Mr. F. Osterrieth, Chairman of the Société Belgo-Anglaise des Ferry-Boats, spoke of Mr. Neil's 20 years' service on the board of that company and presented him with a framed XVIIth-century map of Brussels as a souvenir of his long association with the Harwich/Zeebrugge Train Ferry Service, Monsieur G. Claeys, President of the Société Nationale des Chemins de fer Belges, spoke of Mr. Neil's 35 years' association with the Belgian Railways, and of Mr. Neil's notable contribution to the development of transport relations between Belgium and the U.K. In recognition, Mr. Claeys presented him with the Order of an Officer of the Crown which H.M. the King of the Belgians had been pleased to confer on him. Other guests were Mr. G. Willems, Ministère des Travaux Publics et de la Reconstruction; Mr. C. Mariamé, Ministère des Communications; Messrs. M. De Vos, L. Lataire and G. Van Cauwenberge, Société Nationale des Chemins de fer Belges; Messrs. G. Vanheurck, L. Antoine, L. Verhulst, E. Dutilleul, H. Robyn and R. Weber (Administrateur-Délégué); Belgian members of the Board of the Société Belgo-Anglaise des Ferry-Boats; Messrs. H. C. Johnson, T. R. Hawkes, S. A. Claydon and W. Brown, Eastern Region, British Railways; Mr. C. W. Edwards, British Railways General Agent for Belgium and

Luxembourg; Mr. H. Elliott, British Road Services; and Mr. M. Gioncada of Milan.

We regret to record the death, on May 12, at the age of 82, of Mr. W. T. Venton, former Western Divisional Commercial Manager, Southern Railway. Mr. Venton entered the service of the London & South Western Railway as a junior clerk in the Goods Department at Exeter in 1892. In 1899 he was transferred to the Chief Goods Manager's office at Waterloo, where he obtained experience in accounts, claims and canvassing work. He was appointed Assistant District Goods Superintendent at Southampton in 1905, and, in 1912, he temporarily undertook the duties of London District Goods Superintendent. In 1913, Mr. Venton became District Goods Superintendent at Southampton, and during the 1914-18 war he controlled the goods work at the military and naval depots of Winchester, Portsmouth and Southampton. He was also the Secretary of the Local Port and Transport Committee for the provision of labour during the latter part of that war. In 1919, on the retirement of the District Goods Superintendents at Plymouth and Exeter, Mr. Venton became Superintendent of the then newly-formed Western (Goods) District, comprising all stations west of Axminster. Mr. Venton became Western Divisional Commercial Manager in 1923, an appointment he held until his retirement in 1930.

Dr. Albert Dobmaier, Chief of the Engineering Department, German Federal Railway, who, as recorded in our May 9 issue, retired on March 31, was born at Würzburg in 1893. After graduation in civil engineering from Munich and further studies in electrical engineering, Dr. Dobmaier went into private industry. He joined the State railway service in 1921 and became Signal Superintendent at Ludwigs-haven. Various other engineering appointments followed and, in 1932, he became Chief Officer for Telecommunications at Berlin. In this capacity, from 1936, he dealt also with signalling. From 1947 he represented the Federal Railway at meetings of the International Union of Railways and the International Railway Congress Association. Under his direction the "Base" railway telephone exchange network was built up in Germany and the lead given to the development of the type of push-button relay interlocking equipment of which the large Frankfurt installation opened last August is an example. Dr. Dobmaier was appointed Chief of the Engineering Department in 1952. He has been responsible for large-scale reconstructions, additional lines, new stations and the extension of electrification and the application of mechanised processes to new work and maintenance.

Mr. Erwin Kessler, who, as recorded in our May 9 issue, has been appointed Chief of the Engineering Department, German Federal Railway, entered railway service in 1928. He has held several civil engineering appointments. In 1951 he was made President of the Divisional Management at Trier, and, in 1955, at Cologne, the position he now relinquishes.

Expandite Limited announces the following appointments:—Mr. T. Pooley, Sales Director, as Deputy Manager; Mr. E. L. Townsend as Director of Overseas Developments (he also joins the board of the company); Mr. J. M. Robb, Manager of the Overseas Division, as General Manager, Expandite (Australia) (Pty.) Ltd.; Mr. J. H. Humphries as Area Manager, Scotland, and Mr. A. W. Moignard, as Assistant

Area Manager, South East England. Mr. Robb will take up his new appointment about July.

Mr. W. H. Barnett, Assistant Express Agent, Canadian Pacific Express Company, Liverpool, has retired after nearly 48 years' service. He is succeeded by Mr. Leslie Acton.

We regret to record the death, on May 6, of Mr. W. McDonald, Managing Director of the Hackbridge Cable Co. Ltd.

Vice-Admiral Sir Frank Mason has joined the board of H. W. Kearns & Co. Ltd.

Mr. Ian MacLeod-Smith has been appointed a Special Director of W. H. Dorman & Co. Ltd.

We regret to record the death of Mr. A. H. Waite, a director of Hadfields Limited and Managing Director of Hadfields Forgings Limited.

Sir Peter G. Roberts, Mr. P. J. C. Bovill, Mr. A. M. Holbein, and Mr. K. E. Walker have been appointed to the board of Ransomes & Rapier Limited.

Mr. J. T. Rees, Switchgear Contracts, British Thomson-Houston, Willesden, has retired, after 47 years of service with the company.

Mr. R. W. C. Reeves, a Director of Johnson & Phillips Limited, has been appointed Director & General Manager of the company. Mr. Reeves joined the company in 1924 and was appointed to the board in 1943.

Mr. P. A. Hearne has been appointed Sales Manager, British Oxygen Aro Equipment Limited. He succeeds Mr. David Ince, who has been appointed Divisional Manager, Guided Weapons Division, Elliot Brothers (London) Limited.

Mr. K. H. Preston has resigned as Managing Director of J. Stone & Co. Holdings Ltd., and has been appointed Executive Chairman. Mr. B. W. Preston and Mr. A. J. S. Brown have been appointed Joint Managing Directors.

Colonel R. T. Hartmann has resigned as Executive Director of British Straddle Carrier Co. Ltd., to devote more of his attention to the business of Materials Handling Equipment (Great Britain) Limited, of which he is Managing Director.

Mr. B. W. Hymass has been appointed Manager, and Mr. J. G. Selby has been appointed Sales Manager of Rosite Limited, a company recently formed by Plessey Co. Ltd. and Rostone Corporation, Indiana, U.S.A.

Sir John Woods, a Director of the English Electric Co. Ltd., has resigned, owing to pressure of other work, as Chairman of the Board of Trade's Advisory Committee on the Revolving Fund for Industry. He is succeeded by Colonel E. R. Mayer, Managing Director of Metalex Industries Limited.

Vickers Limited announces the following changes in group organisation: Mr. J. H. Robbie has been appointed a Director of Vickers-Armstrongs Limited, Mr. E. P. Tomlinson succeeds him as Commercial Director of Vickers-Armstrongs (Engineers) Limited, Mr. A. Lawrence Cooper

has been appointed Secretary of Vickers Limited, succeeding Mr. Tomlinson, and Mr. J. McLean becomes Deputy Secretary. Mr. Tomlinson is succeeded as Secretary of Vickers-Armstrongs Limited by Mr. McLean and as Secretary of Vickers-Armstrongs (Aircraft) Limited, Vickers-Armstrongs (Engineers) Limited, Vickers-Armstrongs (Shipbuilders) Limited, and Vickers-Armstrongs (Tractors) Limited by Mr. T. P. Houghton. Mr. T. C. Raymond has been appointed a Special Director of Vickers-Armstrongs Limited.

Mr. A. J. S. Aston and Mr. R. D. Young have been appointed to the board of Tube Investments, Limited.

Mr. F. O. Ackroyd has been appointed to the board of Crofts (Engineers) Limited.

Mr. R. S. Beacham has been appointed Sales Director of Dunlop (South Africa) Limited.

Mr. J. O. de M. Hopper, Overseas Representative, Expandite Limited, is visiting distributors in Italy and Yugoslavia.

Mr. J. W. Whimpenny, Joint Managing Director, W. H. Dorman & Co. Ltd., accompanied by Mr. L. Johnson, Project Development Engineer, is visiting South and Central Africa.

Mr. George Carr, Dunlopillo General Sales Manager, has been elected Chairman of the British Latex Foam Manufacturers' Association, in succession to Mr. L. Harral.

Vickers Limited announces the following changes in the board of the company: Sir Thomas R. Merton will retire on June 2. Sir Sam H. Brown has been appointed an additional director.

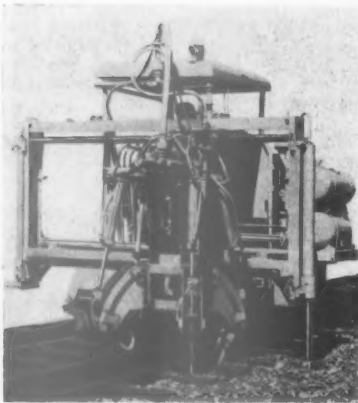
Metropolitan-Vickers Electrical Co. Ltd. announces the appointment of Mr. L. H. J. Phillips, Sales Manager, Electronics Department, as Assistant Commercial Manager. Mr. A. G. Barton succeeds Mr. Phillips as Sales Manager, Electronics Department.

Mr. R. C. Hesketh-Jones, Sales Director Industrial Division, British Oxygen Gases Limited, has been appointed Chief Executive (Overseas) of the British Oxygen Co. Ltd. He is succeeded by Mr. R. J. Foster, Director and General Manager, British Oxygen Aro Equipment Limited. Captain Q. P. Whitford will take charge of the Aircraft Equipment Works at Harlow.

The British Thomson-Houston Company announces the following changes in management of its district offices:—At the end of April, Mr. F. C. Barford, Manager, Birmingham District, becomes Manager of the Small Industrial Machines Department at Birmingham. He is succeeded by Mr. K. J. Clarke, now Manager, Sheffield District. Mr. W. J. Wilson, Manager, Leeds District, will succeed Mr. K. J. Clarke as from May 1, and Mr. J. N. Griffiths becomes Manager, Leeds District, from the same date.

Mr. Duncan Bailey and Mr. Russell Bailey have been appointed to the board of Hurst Nelson & Co. Ltd., and have been elected Chairman and Managing Director respectively. Mr. John Henshaw and Mr. S. A. A. Knott have also been appointed to the board. Mr. James Waddell continues as a Director and Lt-Colonel Arthur N. Forman, Mr. John T. McIntosh and George E. G. Forman have resigned.

NEW EQUIPMENT AND PROCESSES



Small Ballast Tamping Machine

THE McWilliams Spot Tamper, stated to be the first spot tamper designed to provide large-tamper compaction quality, has been developed by the Railway Maintenance Corporation of Pittsburgh, U.S.A. The machine is for smoothing, spot surfacing, and yard and station maintenance. It also is recommended for general tamping on railways where the length of track does not warrant a production tamper.

The machine clamps itself to rails, then raises the track to the desired height by using one or two self-contained hydraulic jacks. Four air-operated guns of special design are used for tamping in two positions at each rail. The cycle for tamping both ends of the sleeper is about 35 sec.

The tamper produces the same tamping pattern as the 16-tool McWilliams Multiple Tamper. Each of the four guns provides the same down pressure per tool as is

available with the large machine, resulting in solid tamping of uniform pattern.

Because the tampers are ahead of the wheels, machine will tamp off the jacks and there is no settlement when jacks are removed. It will tamp 75 per cent of a turnout, and a manifold is provided for tamping the remainder with hand guns.

It is also designed to allow of the use of spiking and nutting attachments if required.

In operation, the machine is spotted with rail clamps under the base of the rail, and then either or both lifting cylinders are lowered into the ballast until the track is raised to desired height. The tamping head is lowered hydraulically and the tamping is effected in eight positions. If tamping of both ends of the sleeper is desired, the guns are moved horizontally to the other rail where eight more positions are tamped.

Further details may be obtained from the manufacturing company, or from Beyer Peacock Railway Equipment Limited, Locomotive House, Buckingham Gate, London, S.W.1.

Parallel Motion Drafting Machine

THE Straightedge drafting machine can be fitted to any existing wire type of parallel motion. It is claimed to retain all the advantages of normal parallel motion with the additional facility of a drafting machine.

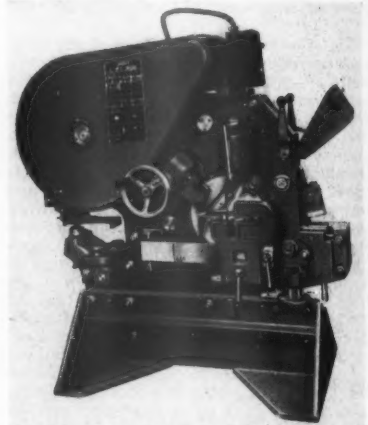
The drafting head is mounted on a graduated alloy bar fitted to the straightedge and acting as a track. Each end of the straightedge is attached to the parallel motion wire by a finger control knob; this facilitates angular movement of the straightedge on the drawing board to allow simple line-up with the drawing. Both transparent edges of the straightedge can still be used thus retaining the

advantages of a parallel motion unit.

Features in design include both straightedge and carrying rail of the same alloy eliminating any differential expansion, to preserve accuracy; the head is fitted with large ball bearings; the divided protractor head is graduated from 0-90 deg. in both directions and provided with vernier scale readings to half degrees.

Automatic location of principal angles by the finger-tip control, and instantaneous positive locking in any position are provided. Fine horizontal control is obtained by a thumb-control wheel at the lower edge of the straightedge. Attached to the drafting head is an adjustable index piece which allows measurements to be read directly off the graduated rail.

The device is made in double elephant and antiquarian sizes; the price of the double elephant size, ready for fitting to an existing wire type of parallel motion is £25. Further details may be obtained from the manufacturer, Angula Engineering Co. Ltd., Glaskin Mews, Pembury Road, Clapton, London, E.5.



Punch and Shearing Machine

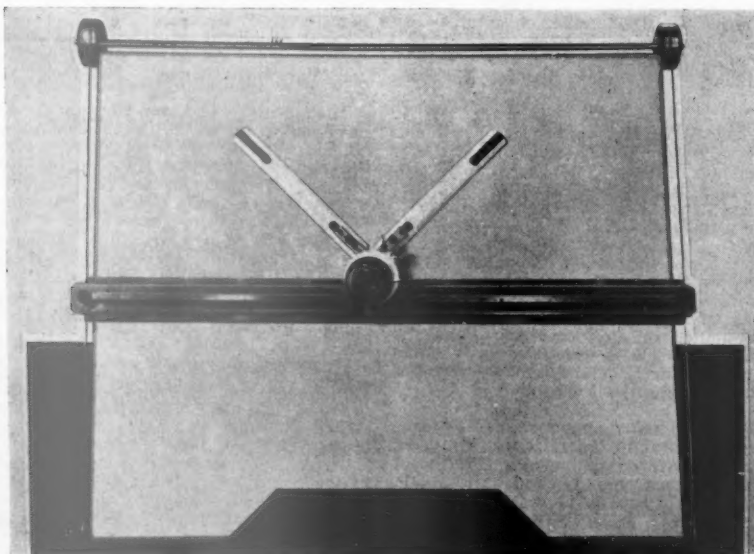
THE Cardiff No. 2 power punching and shearing machine has been developed to meet the demand for a larger, more powerful machine than the No. 1 model. The machine frame is built from steel plates throughout, and adequate bearing surfaces are provided.

Fitted with nickel chrome steel blades, this machine will cut up to 1-in. sheet steel of up to 28-ton tensile strength.

The drive is taken from a high-torque built-on motor through triple vee belts operating direct on to the flywheel. This is mounted on ball and roller journals and drives through reduction gearing on to the two bull wheels which in turn, through the dog clutches, operate the two main eccentrics.

The two independent clutches are incorporated, one for operation of punching mechanism and the other for the operation of the cropping, notching and guillotine mechanism. The design is such that after one stroke of any mechanism the clutch automatically disengages.

The machine is equipped with a one-shot lubrication system which feeds oil to all bearings, fulcrums and important parts;



a grease gun is supplied as standard equipment.

The main frame, at the punching station, is shaped with a throat to receive up to 10 in. \times 3½ in. channels, or 12 in. \times 5 in. rolled steel joists so that holes may be punched to standard dimensions in webs and flanges.

The one stroke per cycle punching mechanism is engaged by the left-hand operating lever; lowering of the punch on to work is performed by the right-hand lever. The latter brings the punch down on to the work or into the die for checking the lineability of punch and die.

The punch is held against its bolster by a nut with conical seating. The circular die is easily removed for insertion of other sizes. To facilitate punching holes in small-section angles, channels or joists, dies with bore eccentric to outside diameter are available.

The cropping of angle and T sectional material can be done, at 90 deg. or any included angle down to 45 deg., in the main centre blades up to 3½ in. by ½ in. and 2½ in. \times ⅞ in. respectively. Notching, plate shearing and bar cropping can also be performed on this machine. Maximum sizes are ¾ in.; ½ in.; and 1½ in. dia. or 1½ in. square respectively.

The Cardiff No. 2 machine is manufactured by B. Elliott (Machinery) Limited, Victoria Works, Willesden, London, N.W.10.



Air-Operated Hydraulic Pumps

TO provide a compact source of hydraulic power for presses, jacks, and similar works equipment, a range of compressed air-operated pumps has been designed, known as the Airhydro power unit. This design fills the gap between the Standard Airhydropump, which is sometimes too large or expensive, and the Junior Airhydropump, which has a limited output.

There are nine models covering a hydraulic pressure range from 62 to 22,500 lb. per sq. in. from a normal compressed air supply of not more than 100 lb. per sq. in. The weights of the complete units vary from 50 to 80 lb.

All models are 12 in. high and overall diameters vary from 7½ to 12 in.

The pump works on the principle that the air pressure applied to a large air piston imparts a thrust to a hydraulic ram of smaller area and creates a high hydraulic pressure. The air reducing and control valve, supplied as part of the pump, enables intermediate pressures to be obtained.

It is possible to maintain a static pressure indefinitely without consuming any air. If the balance is disturbed through a leak

or a movement in the power loaded machine, the pump will automatically move sufficiently to maintain the hydraulic pressure required. Consumption of compressed air is limited in proportion to the amount of hydraulic fluid being delivered by the pump. There is no wastage through unwanted fluid being relieved and by-passed to drain or to the reservoir.

The change-over mechanism can run for long periods without attention. The inlet and outlet water valves are of the spring-loaded ball type, with stainless steel bodies. It is claimed that they can retain a good seating throughout prolonged working.

Materials used throughout are non-ferrous or stainless steel, and the air and hydraulic packings are of the fabric reinforced synthetic rubber type. These are suitable for water, kerosene, and most hydraulic fluids in regular use; but for corrosive liquids, special seals can be fitted.

Delivery is generally ex stock and not more than three weeks. The manufacturer is Charles S. Madan & Co. Ltd., Vortex Works, Atlantic Street, Altrincham, Cheshire.

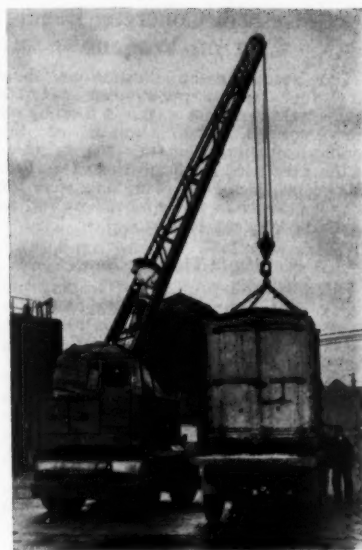
Circular Saw

A LARGER version of the manufacturer's present 2-in. circular saw has been introduced. This saw, a 3-in. size, known as the Zipp, is a compact unit designed to give a clean, burr-free cut on thin extruded sections and tubes, beside solid sections. The clean cut made by this machine can prove particularly valuable, as it avoids the necessity of subsequent deburring operations. A number of the heads have been incorporated as part of automatic-cycle machines.

Two features which are conducive to the clean cut made on this machine are the special tooth form of the blade and geared drive. The saw is capable of high production rates and is claimed to be more economical in use than abrasive machines as it avoids deburring costs and reduces replacements.

The 3-in. Zipp saw can be supplied with plain or swivel pipe vice or swivel machine vice, and either single- or three-phase mains supply. The accompanying illustration, although of an earlier version, shows the general appearance of the saw.

Further details can be obtained from the distributors in this country, William Urquhart, 1023-27, Garratt Lane, London, S.W.17.



Diesel-Electric Cranes

COVERING capacities of from 6 to 45 tons and designed for operation as self-propelled, truck-mounted, or railway shunting duties, a range of Coles cranes has been introduced to supersede previous models; the present covers 15 models. All the cranes incorporate variable voltage diesel-electric transmissions, with the superstructure carried on a large diameter ball bearing slew ring. This eliminates the normal centre post and gives a more even local distribution on the chassis.

The self-propelled models operate in the 4 - 6 m.p.h. speed range, while the truck-mounted machines travel at road vehicle speeds. A range of jib extensions are available, and four-wheel drive and power-assisted steering can be fitted on models where this is not included as standard equipment.

The main advantage claimed for the diesel-electric transmission is the simplicity and high degree of precision control. With the engine idling, a pilot switch in the cab is engaged for the motions required and control of the speed of motion is then through the accelerator pedal. All motions may be operated independently or together, and the engine cannot be stalled. Protection is provided by travel limit and overload switches. When power is cut-off on overload, the load is automatically held by an electro-magnetic brake, but prior to cut-off both visual and audible warnings are given.

The diesel engine is direct-coupled to a variable voltage generator and this supplies current to separate motors for the hoist, derrick and slew motions. Economy of operation is claimed as the engine speed is automatically reduced to idling between operations. Heavy-duty contactors, operated by the pilot switches, are housed in an accessible container located on the crane superstructure. The illustration shows the S1210 self-propelled mobile crane which has a 10-ton capacity at 20-ft. rad.

Full details of the cranes may be obtained from the manufacturer, Steels Engineering Products, Limited, Crown Works, Sunderland.

Pre-stressed Concrete Beams Cast on Wagons

The accompanying illustrations show how four 18-ton pre-stressed concrete beams were cast on a wagon in a siding off the Deptford Wharf branch of the Southern Region, alongside the premises of the Liverpool Artificial Stone Co., Ltd. The beams, each 54 ft. 9 in. long, were for a bridge, and had to be moved by rail to Banbury, Western Region.

Casting in Three Sections

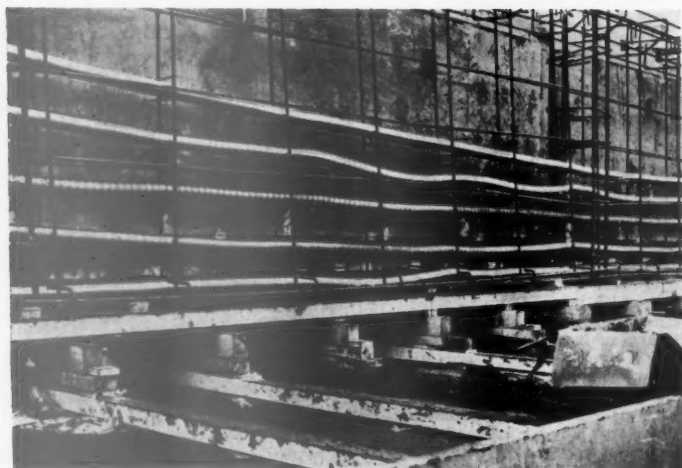
Faced by the problem of loading unwieldy cast beams on to wagons in a place where overhead space is restricted, the firm's engineers thought of casting them *in situ*.

Eventually the beams were cast in three sections, two 10-ft. long end blocks and a centre piece. The end blocks were made in the works and set in position, and then the centre sections cast on the wagon, in the open.

This was done by welding a base pallet into position between each end block and fastening to it the moulded sides.



Pre-stressed concrete beam after being cast on wagon



Pre-stressing sleeves, showing also the mounting of the shuttering



Skip for pouring cement

Long-Welded Rail Depot for the L.M. Region

Work on a new depot for manufacturing long welded lengths of rail has been started at Castleton near Rochdale by the London Midland Region of British Railways.

Primarily it is designed to produce, from standard 60-ft. lengths of rail, long welded rails in 300-ft. lengths, but allowance has been made for the production of 600-ft. lengths in the future. Machines for the new depot are already on order and it is expected that production will start early in 1959.

It is now the policy of the British Transport Commission to use long welded rails on all main-line tracks and the rail welding installation under construction at Castleton is being established to supply the requirements of the London Midland Region. It will be sited in the central materials depot, which is the reception point for rails delivered from the steel rolling mills in the North.

In developing the new layout, practices and experience in France, Germany, and America have been taken into consideration, and its designers consider that Castleton depot will be the most modern and efficient of its kind. The plant will be capable of welding the following types of rails: 109 lb./yd. and 98 lb./yd. flat bottom; 106 lb./yd. conductor rails for third- and fourth-rail electrified lines; 100 lb./yd. and 95 lb./yd. bullhead.

Mechanisation

Mechanisation has been adopted to the maximum extent possible throughout the production line, and where possible machines have been made completely automatic. The machines are connected by powered roller conveyors practically eliminating all manual labour, and saving a considerable amount of time during the course of production.

The main machines used, in sequence, are: combined horizontal and vertical rail press for straightening rails; a wire brushing machine for cleaning rail ends;

a flash-butt welding machine for welding the joints; a stripping machine for removing surplus weld metal; a post-heating machine for stress relief; a grinding machine for grinding the welded joints to normal rail profile; and a combined horizontal and vertical rail press to ensure that all welded rail joints are perfectly aligned.

Handling Equipment

After passing through these processes the finished rail is moved by a powered roller conveyor to a storage and despatch dock. A series of power operated hoists working synchronously are provided for lifting the long rails on to the dock for storage, or on to rail wagons for despatch.

The London Midland has several sections of main line laid with long welded lengths, the total mileage to date being 17. Longest welded length yet installed is one of 2,400 yd. between Silverdale and Arncliffe.

In all of these cases rail lengths of 300 ft. were delivered to site and welded into long sections *in situ*.

Staff and Labour Matters**Railway Wage Claim***Commission's offer of 3 per cent as from June 30, 1958*

The negotiations between the British Transport Commission and the three railway trade unions on the claims for improved rates of pay for salaried and conciliation staff employed on British Railways reached a critical stage at the end of last week. After meetings between the Chairman and representatives of the Commission with union leaders the Commission issued the following statement setting out the trend of developments and outlining the proposals which the Chairman had submitted to the unions in an attempt to overcome the impasse:—

"The British Transport Commission thinks it right that at this stage of the negotiations with the three railway trade unions it should make known its proposals for resolving the issue.

"The claims for higher wages and salaries presented by these unions were referred to the Railway Staff National Tribunal. On April 10 the Tribunal, by majority, decided that, in the light of the financial circumstances of the Commission, it could not recommend an increase of wages for British Railways at the present time.

"When the trade unions rejected this award the Chairman of the British Transport Commission took the initiative to open discussions with them on means for resolving the difficulty. He informed them then that the Commission was not in a position to vary the Tribunal's award and could not afford to pay higher wages immediately. He outlined certain proposals which he was prepared to put to the Government with a view to bringing about an improvement in the Commission's financial position which would make a review of railway wages possible at a later date.

"This led to the meeting with the Prime Minister on April 22, and to the discussions which followed between the Government and the Commission, the results of which have been published.

"On Tuesday, May 6, the Chairman of the Commission informed the trade unions of these results.

"He has since informed the trade unions that he was prepared to agree that in the autumn (say October) in the light of the proposals which had been put forward by the Commission and the Government's reply, some improvement in railway wages and salaries should be made. While he was not willing to define the size of this improvement, he said that in fixing it the Commission would wish to take account of all the implications of the comments of the Tribunal.

"The Chairman further offered to meet the trade unions in mid-July to review the progress of events and re-assess the position. At such a meeting a review could be made of the general economic situation, of the current state of the Commission's finances and of any other factor which might point towards an earlier improvement in the wages level.

"He regretted that he could not make an offer of an immediate improvement. In the light of the limit placed by the Government on the Commission's borrowing powers, as well as of ordinary financial prudence, the Commission could not afford to make such an offer. The Tribunal had confirmed this.

"The Commission recognises that the attitude of the trade unions since their claims were first submitted has been reasonable and moderate. In asking them to be patient for a further comparatively short period, the Commission has pointed out that a firm promise to raise wages in the autumn, in the light of the present state of the Commission's finances and of the Tribunal's award, must be regarded as a generous offer. Some further patience would be well repaid both by the lasting benefits to the industry already secured and by the good will which it would earn from the nation."

The trade unions separately and later together discussed what their next step should be in view of the fact that the Commission could not give an immediate increase in rates of pay. On Thursday, May 8, the Minister of Labour invited the Chairman of the British Transport Commission and leaders of the three unions to meet him on May 9 to discuss the whole situation. The Chairman of the Commission was accompanied by the Deputy Chairman, and Mr. A. B. B. Valentine and Mr. J. W. Watkins. The unions were represented by their full negotiating committees led by the three General Secretaries. The Minister of Labour was accompanied by his Parliamentary Secretary and Sir Wilfred Neden, Chief Industrial Commissioner.

After preliminary discussions with the Minister, Sir Wilfred Neden discussed the position with the trade unions and then with the Commission and later with both parties together. It was agreed that further joint talks should take place with the Minister on May 13.

On Sunday, May 11, the Prime Minister had a discussion with the Chancellor of the Exchequer, the Minister of Labour, the Minister of Transport and the Home Secretary and Leader of the House of Commons.

On Monday, May 12, the Prime Minister discussed the situation with the Minister of Transport and the Chairman of the British Transport Commission following which there was a meeting of the Cabinet.

Offered Increase of 3 Per Cent

At a meeting between the Commission and the trade unions on May 13 further discussion in regard to the railway pay claims took place in the light of the measures to strengthen the finances of the Commission discussed between the Government, the Commission, and the unions.

With these measures in mind and to resolve claims under discussion an increase of 3 per cent in railway wages and salaries was proposed to take effect from the pay week beginning June 30, 1958.

With regard to the views expressed in the report of the Tribunal relating to railway wages and salaries the Chairman of the Commission said he would be ready to discuss with the trade unions at an appropriate time the setting up of an inquiry to make a comprehensive examination of the wages structure. This could be an independent or an internal inquiry. The terms of reference would be agreed.

The trade union representatives undertook to report these proposals to their

executives and to give the Commission a reply as quickly as possible.

Minister's Letter

The following is the text of a letter from the Minister of Transport & Civil Aviation to the Chairman of the B.T.C.:—

"As a result of the meeting which the Prime Minister held on April 22 the Government, the Commission and the unions agreed to take certain measures to strengthen the finances of the Commission. These measures were outlined in our recent interchange of letters. It is estimated that they would increase the Commission's resources by about £10 million in a full year. This is in addition to the other steps which you are already taking to improve the net revenues of the Commission for the purpose of conforming with the terms of my letter of April 22.

"After your meeting with the unions on May 9, the Government asked you to review the possibility of increasing still further these savings and economies. As a result the Commission has now agreed that over and above the very heavy commitments which it has already undertaken, they will achieve a further reduction in its working costs, cutting further services if necessary for the purpose. Examples of services that may be affected are given in the note enclosed with this letter. The Government understands that the unions for their part will accept whatever staff adjustments are necessary to carry out the full programme of cuts and economies. In addition the Government has recognised the need to accelerate the modernisation of road bridges and level crossings and has undertaken to examine as a separate matter the adjustment of the Commission's obligations in regard to their maintenance.

"This second examination has given a firm assurance of a further improvement in the Commission's finances, as a result of savings and economies, in addition to that envisaged in our earlier exchange of letters. Although the full benefit of all these measures will not be felt at once, additional money will accrue from them progressively over the next 12 months.

"As the Prime Minister said at the meeting on April 22, there can be no question of the Government's giving a subsidy to meet the cost of increases in railwaymen's pay. The extent and timing of any increase must therefore depend on the view the Commission takes of its ability to pay having regard to the improvement in its financial position that will result from the measures which have now been decided upon in the discussions between the Government, the Commission and the unions."

Enclosure to Minister's Letter

In an enclosure to the Minister's letter, the following list of services liable to be affected by the proposed economies was given:—

Marylebone-Leicester-Nottingham.
Northampton-Market Harborough.
Rugby-Leamington.
Sheffield-Cleethorpes.
Sheffield-Chesterfield.
Cambridge-Colchester.
London-Wolverhampton.
London-Swansea.
London-Plymouth.

London off-peak suburban (Southern Region).

Tyneside suburban.

On May 14, the N.U.R. announced its intention of resuming talks with the Commission to clarify some of the points made in the offer. It is understood that more information was required as to the redundancy expected to arise from the proposed economies. Although the N.U.R. would prefer to hold such further discussions together with representatives of A.S.L.E.F. and the T.S.S.A., it was prepared to conduct its own negotiations if the other two unions decided that for their part further discussion was unnecessary. At time of going to press the matter was still under discussion between the three unions and a date for the new talks with the Commission had not been announced.

Annual Conference of T.S.S.A.

The annual conference of the T.S.S.A. opened at Llandudno on May 12 and in his presidential address Mr. R. Gunter said that conditions were as grave as any which had faced the railways, but it was hoped that peace with honour and justice would resolve the difficulties.

Strike of London Busmen

At the time of going to press the strike of London busmen continues.

Underground Railway Workshop Staff

On May 8 the London Transport Executive rejected a claim for a substantial increase in pay and a 40-hr. week on behalf of approximately 4,000 men in London Transport's railway workshops. The union leaders are reporting back to their Executive Committees. A similar claim in respect of workshop staff on British Railways has already been declined.

Railway Shopmen Redundancy

The Executive Committee of the C.S.E.U. on May 8 discussed the question of redundancy among railway shopmen which is occurring in different parts of the country. In the view of the Executive Committee the position is likely to worsen and they are proposing to seek a meeting with the employers at national level.

Parliamentary Notes

Prime Minister on the Railway Position

The authority and freedom of Sir Brian Robertson, as Chairman of the British Transport Commission, and of Sir John Elliot, as Chairman of the London Transport Executive, to act in wage negotiations was questioned and challenged in the debate on the Labour Censure Motion on the London omnibus dispute in the House of Commons on May 8, and both the Minister of Labour and the Prime Minister made positive statements refuting the Opposition contentions.

Mr. Alfred Robens (Blyth—Lab.) said: "For goodness' sake, do not keep up this pretence that the men can go to Sir John Elliot or to Sir Brian Robertson and argue the case on its merits. They simply cannot do so, because neither of these two gentlemen is a free agent in any way whatever."

Mr. Iain Macleod, Minister of Labour & National Service, replying to the question raised by Mr. Robens why he saw a distinction between his inaction at this stage of the bus dispute and the action he had taken in relation to the rail dispute, said there were two simple reasons. The

first that he had no contact, nor had his Ministry, at any time with the disputants in the rail argument. That was not so about the bus dispute. It seemed to him wholly right that, at the moment when at least the question of the issue of strike notices was being considered, he should have the sort of discussion with the railway unions that had taken place in the bus dispute. Secondly, he saw a very real and important difference between the position in relation to arbitration with the buses and the railways. He thought it a matter of principle that he should take no action which could in any way be interpreted as a variation of an award of the Industrial Court.

"The machinery of looking into railway procedure," added Mr. Macleod, "is very different indeed. It was laid down from the beginning that it was certainly more than a recommendation, but less than an award, and that there was no obligation on the parties to accept it. Therefore, I do not regard a question of principle in relation to arbitration as at stake in the same way in the rail dispute as I did in the bus dispute. It is therefore right to call in, as I have done, the parties in this dispute to discuss the present position with me tomorrow."

Mr. Walter Monslow (Barrow-in-Furness—Lab.): Will he tell us whether Sir John Elliot or Sir Brian Robertson had the authority to effect a settlement without prior consultation with Her Majesty's Government?

Mr. Macleod: As far as I am concerned, entirely. If the hon. gentleman wants to ask any other Minister, he must, of course, ask him.

Railways and National Economy

Mr. E. H. C. Leather (Somerset N.—C.) said that some weeks ago when the railway dispute was at one of its numerous critical stages, there was great pressure that the leaders of the unions and the employers should see the Prime Minister. He felt that that was a great mistake, but it was publicly applauded by the Party opposite, both in the House and outside. Industrial disputes were difficult enough in any conscience. If every major industrial dispute was to be dragged on to the floor of the House of Commons and turned into a party wrangle, nothing but harm would be done.

Mr. Hugh Gaitskell, Leader of the Opposition, said: "We all realise that another and more serious strike may follow. We hope very much that it will not, because, whatever may be our point of view on the causes of the present situation, none of us, in any quarter of the House, would wish to see our economy suffering the damage which it will suffer if there is a railway strike."

"I ask the Prime Minister the question which the Minister of Labour declined to answer: is it the case, or is it not, that Sir Brian Robertson and Sir John Elliot are free to make whatever settlement they think fit with the unions in both the bus and the rail dispute, or do they have first to refer any question of that kind to the Minister of Transport or to other Ministers?"

The Prime Minister (Mr. Harold Macmillan) said that Mr. Robens and also Mr. Gaitskell tried to show that the bus strike, together with other industrial disputes, was the result of deliberate Government policy. It was one thing to criticise the economic policy of the Government as mistaken or unsound. But it is quite another thing to accuse the Government of the day of deliberately provoking in-

dustrial disputes. This charge was without foundation.

Mr. Macmillan, dealing with the various types of arbitration, said there was one type which followed a voluntary reference to an industrial court. In this case there was a moral obligation to accept an award, and it had, until recent times, never been repudiated. Then there was the form of arbitration written into the nationalised industries conciliation machinery—except the railways, which is a special case. It implied some obligation on the parties—it was not absolutely obligatory, but there was a general implication that awards would be accepted.

"The exception, of course, is the railway industry which developed many years ago a conciliation system of its own, which culminates in an arbitral award," explained Mr. Macmillan. "It has always been understood that in each case neither side was under any absolute obligation to accept the arbitration, although it was generally accepted. This system, which has been built up over many years under the old railway system, was preserved when the railways were nationalised, differently from coal, gas, electricity, and others. . . ."

Discretion of Arbitrators

"There is then, of course, the type of procedure one might call arbitration, for instance, the Industrial Disputes Tribunal, which imposes a legal obligation on both sides to accept an award of arbitration. The allegation has been made that we have tried unfairly to influence the arbitrators; that, in fact, we have tried to tell them what sort of awards we expect them to make. That is as I understand it."

"Of course, this is completely and absolutely untrue, as, indeed, is clear from the fact that the arbitrators have continued to award increases where they think them justified. The arbitrators must judge, and are left to judge, in their own discretion. In fact, we know no more than anybody else what the arbitration will be until we read the award. It is, of course, true—I do not, of course, evade this question at all—that arbitrators, being human beings, presumably read the broad arguments on economic affairs which go on all the time both in the press and Parliament. It is equally true that this Government, like other Governments, have made pronouncements about economic questions, including that of awarding increases."

"... I was asked whether the chairmen of the various nationalised boards are absolutely free to act on their own in these wage negotiations. The answer is, of course, that they are completely free to act within their own resources, but quite apart from the responsibility that lies in all the Acts upon the Minister, whether of Transport or of Power, when the Government have not only, as it were, to be the equity holder but also the banker. I say quite frankly that they have not a free right to draw on unlimited overdrafts. That seems to me a sensible situation."

Mr. David Jones (The Hartlepool—Lab.): "The Prime Minister has now said that the Transport Commission, which is concerned in these disputes, is free to do what it likes within its own resources, but the Minister of Transport denies the Commission the right to raise the price of its product when the cost of producing it goes up."

The Prime Minister: "Not at all. I had some valuable—I hope they may prove fruitful—discussions on this matter with the Chairman of the Transport Commission

and three of the railway unions. I think there was general agreement that simply to put up the fares and the freights would be going too far, and that the returns would be diminished. I am not sure that this may not be true of the buses. There was general agreement that some other solution must be found than just piling on the charges. Everybody feels that that method must come to an end."

Working Conditions on Railways

The House of Commons discussed on May 9 working conditions on the railways and the effects of modernisation on a motion submitted by Mr. Francis Noel-Baker (Swindon—Lab.) calling on the Government "to make further provision for the health, welfare, and safety of railway and allied workers, in the light of the recommendations of the Gowers Committee, and to ensure that their interests, as well as those of railway users, were fully considered while modernisation is taking place."

Mr. Noel-Baker said that the Opposition and, he thought, railwaymen and their representatives in the unions accepted the necessity for the modernisation programme, and realised that among its effects would be an inevitable reduction of employment in some parts of the industry, and the contraction of some railway establishments. This would apply on the operating side, where faster and more efficient trains and methods of handling would mean a reduction in staff, and also to the railway workshops. There would inevitably be some redundancy; and it was important that there should be really adequate consultation with the men before decisions were taken.

Another matter causing concern in railway workshops was the contracting of work to private firms. The men did not understand why the workshops should not, if necessary, be adapted and re-equipped to take on the new type of work necessary.

Mr. Noel-Baker said he accepted that the B.T.C. had been doing what it could during the past few years. The Labour Government was not really in a position to legislate after the Gowers Committee first reported. The fact, however, was that its recommendations were generally accepted. Legislation on them would be a help to the Commission.

Mr. David Jones (The Hartlepoons—Lab.) said that the Commission was employing West Indians because it could not get British people to accept jobs on the railways with their horrible working conditions.

Mr. G. R. H. Nugent, Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation, replying to the debate, noted that it had been proposed that the inspectorate for the safety conditions of the railways should be under the same roof as the Factories Act Inspectorate, in the Ministry of Labour instead of the Ministry of Transport; that was a suggestion he would like to look at. There was no change in Government policy as to the principle of introducing legislation in implementation of the Gowers Report. The practical effect of what could be done under such legislation was being done now. About £11 million worth of welfare building was completed up to the end of 1956, and a further £2½ million was authorised in 1957. Many of the modernisation schemes were accompanied automatically by improved conditions for the workers. For the present the rate of work on welfare schemes was as high as any legislation could contemplate. The Commission was giving every consideration to its own workshops, and

was keeping their capacity filled. Any cuts it had had to make it had met by throwing most on the cuts of locomotives on to private industry. In January, 1956, there were 125,471 employed in railway workshops; in January of this year, there were 128,276. The latest figure was about 500 less than that. It was evident that no serious reduction was going on.

After describing the shunter as having one of the hardest jobs in the railway, Mr. Nugent referred to the marshalling yard at Thornton, Scotland, as having substantially removed the worst of the hard graft and mechanising pretty well the whole of the operation. Soon there would be some yards like that nearer London.

The Commission had been actively following the policy of developing

relationships between management and men. It had now some 200-300 joint local departmental committees, and the management was making every endeavour to try to get more success at all levels of management. The Commission had issued a booklet on the subject for the guidance of all concerned, and gradually it was having effect, but railwaymen took slowly to changes. There was a wide range of training schemes. No one was more anxious than Sir Brian Robertson, Chairman of the B.T.C., to give that kind of help to enterprising youngsters. One had only to look at the top now to see how many had worked their way right from the bottom to the top, and that was surely in the best tradition.

Mr. Noel-Baker's motion was carried at the end of the debate without dissent.

Contracts and Tenders

First contract for the Bornu extension, Nigerian Railway

Following the loan of U.S.\$28,000,000 from the International Bank for Reconstruction & Development, the Nigerian Railway Corporation has placed the first contract for the construction of the Bornu extension with Sterling Astaldi (Africa) Limited. The work is expected to start in September of this year for completion in the early part of 1961. The value of this contract is some £2,300,000, and covers construction from Kuru to Bauchi.

Dorman, Long (Bridge & Engineering) Limited, have received orders from the British Transport Commission for the supply and erection of three steel railway bridges over the new London/Yorkshire motorway. The bridges are located in Luton, near Northampton, and near Rugby, and will be completed during the Summer of 1959. The fabrication of the steelwork totalling some 540 tons will be undertaken in the Tees Side Area, and the total value of the contracts is £86,405.

W. T. Henley's Telegraph Works Co. Ltd., have received further contracts from the British Transport Commission for the supply of 6,000 yd. of .15 sq. in. 25-kV. single core solid type cable for British Railways, Eastern Region (Colchester-Clacton-Walton) and 24,000 yd. of .20 sq. in. 25-kV. single core solid type cable for British Railways, London Midland Region (Crewe-Manchester). These contracts cover the supply of all straight through joints and outdoor sealing ends in addition to the cable.

British Railways, London Midland Region, have placed an order with Birlec Limited of Birmingham for two electric arc melting furnaces. It is understood that this will be the first electric melting equipment to be installed in the Region. The new furnaces will be installed in the Crewe foundry, and will produce 21 tons of high quality steel a day. Each furnace has a nominal capacity of 3½ tons and an electrical rating of 2,000 kVA.

British Transport Commission, South Wales Docks, has placed the following contracts:—

Scottish Cables Limited: provision of cables for crane plugs, bulk discharging berth, No. 2 dock, Barry
Prince of Wales Dry Dock Co. (Swansea) Ltd.: general reconditioning of s.h.b. Foremost 44.

British Railways, North Eastern Region, have placed the following contracts:—

Giles (Electrical Engineers) Limited, London: rewiring of clock system and telephone system, Gosforth Car Sheds
Ransomes, Sims & Jefferies Limited, Ipswich: 1-ton mobile slewing crane, Stockton South.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follows:—

From Brazil:

Complete C.T.C. system covering the stretches of line between Barra Funda and Ourinhos Stations, of the Sorocabana Railways.

The issuing authority and address to which bids should be sent is Exmo Senhor director da E. F. Sorocabana, Salao Nobre, Praca Julio Prestes 260, Sao Paulo. The closing date is May 27, 1958. Tenders may be presented by one firm or by a group of firms, in any case the responsible firm must be indicated with registered office in Brazil with which all the arrangements must take place. A receipt must be presented for reception in the office of the railway of the guarantee to the value of 2,000,000 cruzeiros, in national currency or in bonds of the national debt. The Board of Trade reference is ESB/11665/58.

From Costa Rica:

2 diesel-hydraulic locomotives for shunting services and for passenger and goods trains.

The issuing authority and address to which bids should be sent is La Proveeduría del Ferrocarril Electrico al Pacifico, San Jose. The tender No. is 206. The closing date is May 30, 1958. The Board of Trade reference is ESB/12059/58.

50 tons of rail spikes, 500 kegs of 200 lb. each, with a high carbon content, manufactured by the open hearth process, percentage of carbon not less than 0.30, spikes to be supplied in wooden kegs, each keg 200 lb. maximum. Guarantees should be furnished that the spikes will be supplied with points fully sharpened.

The issuing authority and address to which bids should be sent is La Proveeduría del Ferrocarril Electrico al Pacifico, San José. The tender No. is 208. The

closing date is May 23, 1958. The Board of Trade reference is ESB/11869/58.

From Spain:

Points, crossings, crossing frogs, and traversers, for 54.4 kgs. lineal metre type track to the value of U.S. \$310,000. The issuing authority and address to which bids should be sent is Sr. Director de la Red Nacional de los Ferrocarriles Espanoles, Ayuda Economica, San Cosme 1, Madrid. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is May 19, 1958. The Board of Trade reference is ESB/11613/58/ICA.

From Pakistan:

50 sets of steel sleepers for 1 in 12 90R B.G. TSC turnouts
275,000 M.G. transverse steel sleepers.
The issuing authority is the Pakistan Government Railways. The tender No. is 58/1720/7/S. Bids should be sent to the Office of the Joint Director, Civil Engineering, Railway Division, Ministry of Communications, Government of Pakistan, Room 311, 2nd Floor, Pakistan Secretariat Building, Karachi. The closing date is June 2, 1958. Local representation is essential. The Board of Trade reference is ESB/11609/58.

Further details regarding the above tenders, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

Notes and News

Irish Transport Bill 1958.—Mr. Sean Lemass, Minister for Industry & Commerce, introducing the Transport Bill 1958 in the Dail on May 9, expressed the hope that the proposed five-year subsidy of £1,000,000 a year for Coras Iompair Eireann from the Republic treasury, would be more than sufficient for the latter years of the period, so that the board would have something left for the

years after 1964 if complete solvency had not been reached by then. Any further capital outlay by the board should properly be financed by another stock issue, but it was not envisaged that fresh capital expenditure would be required during the five-year period. Mr. Lemass said the bill dealt with C.I.E. matters only, and the Great Northern Railway Board would be dealt with by separate legislation, to be introduced shortly, parallel with legislation on the same subject in Northern Ireland.

Transport Treasures Exhibition: Altered Times of Opening.—The permanent exhibition "Transport Treasures" at Euston will, on and from May 17, be open only on weekdays from 11 a.m. until 5 p.m. It has previously been open to the public from 10 a.m. until 6 p.m. on weekdays, and from 2 p.m. to 6 p.m. on Sundays.

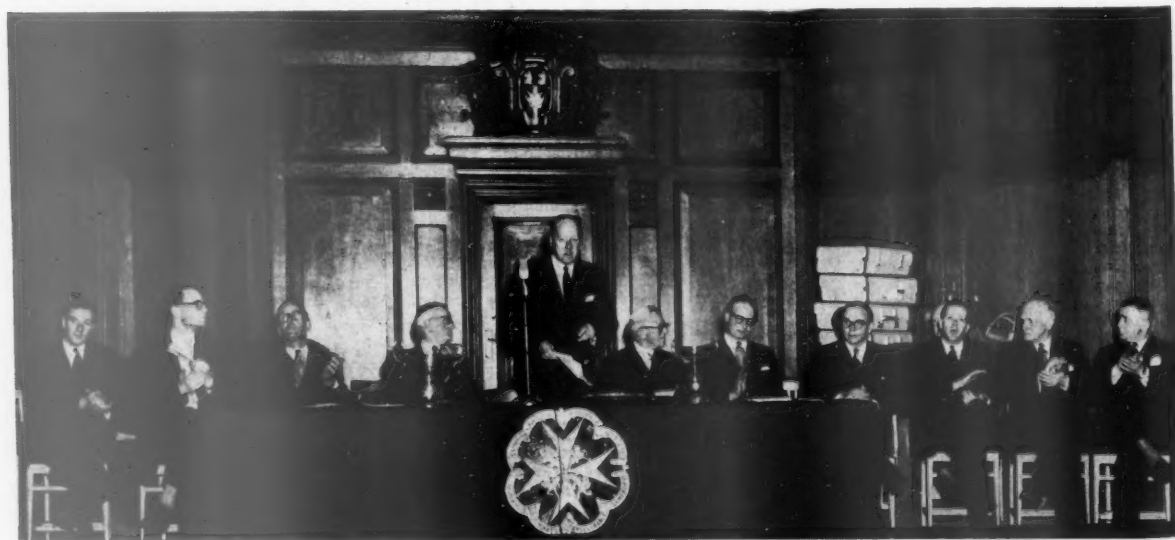
British Railways Amateur Boxing Championships.—The inter-Regional finals of the British Railways Amateur Boxing Championships were held at the Royal Albert Hall, London, on May 8. The challenge shield was won by the London Midland Region with 27 points; the Scottish Region was second with 19 points, and the North Eastern Region third with 15 points. At the conclusion of each bout of the finals, the awards were presented by Sir Brian Robertson, Chairman of the British Transport Commission and President of the British Railways Amateur Boxing Association.

Western Region First-Aid Movement.—The teams which gained the first nine places in the Western Region first-aid semi-finals competed in the final competition held in the Porchester Hall, Paddington on April 29, 1958. The tests were set by Mr. H. S. Taylor-Young, of Salisbury, Dr. B. M. Watney, of London, and Dr. R. Renwick, of Watford. A large number of spectators, including Officers of the Region, witnessed the contest. The subsequent presentation of prizes and trophies was presided over by Mr. K. W. C. Grand, General Manager, and the presentations were made to the winning teams by Mr. P. T. Heady, member of the Western Area Board. The result

of the test was announced by the Regional Ambulance Secretary, Mr. J. A. Martin. Out of a maximum of 500 marks, Bristol D.O.S.O., who won the Challenge Shield, gained 408 and Shrewsbury Locomotive, winners of Carvell Cup, gained 357. The Henry Butt Bowl was presented to the Swindon No. 2 team, who secured the highest position in the beginners' section in this year's competitions. A vote of thanks to the adjudicators, patients and other helpers was proposed by Mr. S. G. Ward, Regional Establishment & Staff Officer, and to Mr. Heady and Mr. Grand by Mr. L. Webber, captain of the winning team. The Bristol D.O.S.O. and Shrewsbury Locomotive teams will represent the Region in the British Railways, Docks and London Transport (Railways) National Competition, in the Central Hall, Westminster on June 4. The accompany illustration shows (left to right): Drs. R. Renwick and B. M. Watney; and Mr. H. S. Taylor-Young, adjudicators; Messrs. P. T. Heady, Member of Western Area Board; K. W. C. Grand; J. A. Martin; S. G. Ward; H. F. Parshall, Director General, St. John Ambulance Association; Dr. C. T. Newnam, Regional Medical Officer; Messrs. H. G. Bowles, Assistant General Manager (Administration); and A. C. B. Pickford, Assistant General Manager (Traffic).

Railway Accident in Brazil.—Two electric trains were involved in a head-on collision in Rio de Janeiro last week killing 130 passengers and injuring 300. It is reported that the accident was caused by a fault in the signal system. Three senior railway officials were later dismissed by President Kubitschek.

New North Eastern Travel Tickets.—On May 12, for the first time on British Railways, the North Eastern Region introduced a day-touring ticket known as the "Day-Line Diesel." This ticket, primarily intended for use on the new diesel coaches operated by that Region, is also available for travel on steam and electric services. Two areas are covered. The Northern Section stretches from Alnwick to Whitby Town, along the Tyne Valley from Newcastle to Carlisle, and south to Darlington via Penrith over the Stainmore Summit. The Southern Section covers all



Mr. K. W. C. Grand, presiding at the presentation of awards after the finals of the British Railways, Western Region, First Aid Competition

leading West Riding towns and cities, including Huddersfield, Halifax, Bradford, and Leeds, and beauty spots from Whitby Town to Scarborough, Filey, Bridlington, Hornsea, and Withernsea. Examples of possible day tours are: 1. Huddersfield-Leeds-Scarborough (2 hr. in Scarborough); Scarborough-Hull (2 hr. in Hull); Hull-Wakefield-Huddersfield. Depart 8.17 a.m., return 7.54 p.m., round trip 190 miles. 2. Newcastle-Carlisle-Penrith (2 hr. in Penrith); Penrith-Darlington-Saltburn (1 hr. in Saltburn); Saltburn-Middlesbrough-Newcastle. Depart 10.30 a.m., return 9.53 p.m., round trip 230 miles. "Day-Line Diesel" tickets cost 15s. (7s. 6d. for children under 14). A souvenir brooch issued with each ticket bears a silver-coloured relief of a diesel coach surrounded by an enamelled circle in North Eastern orange and the words: "British Railways N.E. Region." Brochures advertising the tickets carry a map of the section concerned and full details of tours.

Locomotive Driver Discharged on Manslaughter Charge.—Mr. Christmas Humphreys announced at the Old Bailey on May 7, that the Crown intended to offer no evidence against Driver W. Trew, driver of the steam train which ran into the rear of a stationary electric train at Lewisham, Southern Region, on December 4, on his second appearance for alleged manslaughter of Guard W. R. Reynolds, the guard of the electric train. On the instructions of the judge the jury returned a formal verdict of not guilty and Driver Trew was discharged.

Vickers Limited Report.—The year 1957 was generally one of full production for the Vickers group of companies. Order books remained high in spite of a slow-down in the rate of orders received in some sections and all works and shipyards were fully employed. The engineering works of the group continued to expand the range of their commercial products and several significant advances were made in this direction. A licence agreement to manufacture Sulzer marine diesel engines was concluded and locomotive engines are already in production for British Railways. Steel output was maintained at a high level, and the number of railway passenger coaches built during the year was a record. Group sales during 1957 totalled £202,841,000 compared with £163,379,000 in 1956. Group net profits amounted to £6,385,000 (£6,180,000), and a final dividend of 7½ per cent, making 10 per cent for the year, is proposed. Orders in hand at the year-end were £312,000,000, not including £75,000,000 orders for aircraft announced in 1957 for which contracts were signed only in 1958, compared with £329,000,000 in 1956.

Demonstration to B.T.C. Mechanisation Committee.—A demonstration of the mechanical handling of general goods traffic was recently carried out in the presence of the Mechanisation Committee of the British Transport Commission at Ipswich. The machine used was the Rapier 18/33 fork truck with various attachments to meet the widely varying sizes and types of loads and wagons. The machine has a rated capacity of 18,000 lb. at 33 in. from the face of the forks and a height of lift of 20 ft. The fork truck incorporates the Rapier design of truck mounted on widely spaced front wheels and a twin-wheel articulated rear castor. A patented self-steering device for easy

Western Region at Festival of Wales Celebrations

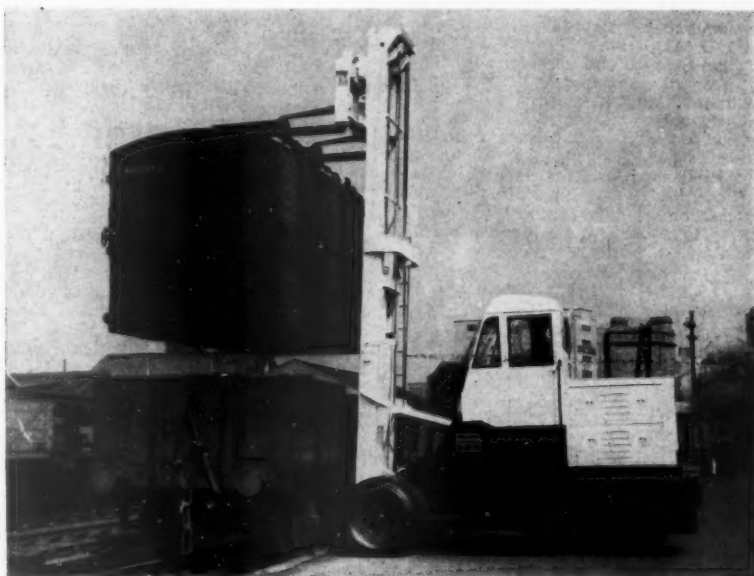


British Railways, Western Region, tableau which took part in a national "Salute the Capital" parade at Cardiff marking the official opening of the Festival of Wales by the Duke of Gloucester on May 3

control and rapid manoeuvring throughout a very wide steering lock is fitted. The machine showed that it could lift fully-loaded railway containers from high-sided wagons and load them on to trailer vehicles. This was carried out on the forks and as an alternative arrangement on a special overhead frame with hooks for lifting from the slinging points at the top of the containers. The handling of sawn timber on the forks and alternatively on a jib mounted to the carriage also was shown. Other loads included refractory bricks on pallets handled on the forks. The final demonstration was carried out with a searcher jib

attached to the fork carriage and included the loading and unloading with cases of a covered wagon.

Opening of Divisional Traffic Manager's Office at Liverpool.—In the presence of the Lord Mayor of Liverpool, Alderman F. H. Cain, the General Manager of the London Midland Region, Mr. David Blee, on May 12, opened the first of the six new Divisional Traffic Managers' Offices in that Region, at 55, Castle Street, Liverpool. The proceedings were introduced by the Divisional Traffic Manager for the Merseyside & North Wales Division, Mr. M. G. E. Lambert. Mr. Blee, in the



Rapier 18/33 fork truck lifting loaded container from high-sided wagon by special lifting attachment

course of his speech, referred to the importance of the office in the new organisation and the effect it would have on railway relations with the business community. The Lord Mayor replied on behalf of the guests.

1958. Production Exhibition.—The Production Exhibition and Conference will be held this year from May 12 to 21 at the Grand Hall, Olympia, London. The organiser is Andry Montgomery Limited, 32, Millbank, London, S.W.1.

Canadian Pacific Railway Strike Ended.—Some 3,000 Canadian Pacific Railway firemen who went on strike on May 11 returned to work on May 13. Passenger and freight services during the stoppage are reported to have been almost normal. The strike was the culmination of a two-year dispute over the removal of 75 firemen from diesel locomotives. The company's decision was supported by a Royal Commission, but the removal of the men on May 11 was the signal for the strike to start.

Oleo Pneumatics Limited Dinner.—At an informal dinner in Birmingham on May 9 given by Oleo Pneumatics Limited, the Managing Director, Mr. J. H. Onions, thanked the companies whose co-operation had made possible the production of hydraulic buffers (described in our April 18 issue); these companies, he said, not only had given what they had been asked to provide, but also had contributed to the great pride in the job. Other speakers were Mr. W. Barnes, Managing Director of Beans Industries Limited, and Mr. G. T. Smithyman, Executive Officer (Carriage & Wagon Production), British Railways Central Staff, Derby.

Cammell Laird Subsidiary Companies Satisfactory Results.—The directors report of Cammell Laird & Co. Ltd. states that results for 1957 have been satisfactory for the three subsidiary companies, Patent Shaft & Axletree Co. Ltd., Metropolitan-Cammell Carriage & Wagon Co. Ltd., and English Steel Corporation Limited. Output and sales of Patent Shaft & Axletree have been well maintained although it is likely that the total output in 1958 will be less than in 1957. Metropolitan-Cammell achieved a record for the number of passenger vehicles built any year, totalling 564 coaches, 531 of which were supplied to British Railways. New wagon orders were obtained from Rhodesia, New Zealand, the Sudan and British Guiana, and for underframes and bogies from Argentina. English Steel production at 582,178 tons was slightly lower than the record for the previous year.

Forthcoming Meetings

May 17 (Sat.).—Transport Treasures Exhibition at Euston open on week-days only (not Sunday) from 11 a.m. to 5 p.m.

June 3 (Tue.) to June 6 (Fri.).—Institute of Transport, 1958 Congress in Dublin.

June 5 (Thu.).—Model Railway Club, at Caxton Hall, Westminster, S.W.1, at 7.45 p.m. Talk on "Famous railway accidents," by Mr. T. S. Lascelles.

June 6 (Fri.).—The Railway Club, at Royal Scottish Corporation, Fetter Lane, London, E.C.4, at 7 p.m. Paper on "The Hastings direct line," by Mr. D. Cullum.

June 7 (Sat.) to June 12 (Thu.).—Permanent Way Institution Summer Convention at Weston-super-Mare.

June 14 (Sat.).—Permanent Way Institution, Leeds & Bradford Section. Visit to Hull Docks.

June 14 (Sat.).—Permanent Way Institution, East Anglia Section, at Ipswich. Film "Teeth of Steel," introduced by Mr. A. Stokes.

Railway Stock Market

Although earlier this week hopes that a railway strike would be averted helped sentiment in stock markets, values both in the gilt-edged and industrial sections again showed declines on balance. The rise in the Treasury Bill rate has dispelled hopes of an early reduction in the bank rate, and this largely explains the reaction in prices of British Funds, though on the other hand, the City remains fairly confident that later this year a 5 per cent bank rate is a probability. Fears of further demands for higher wages in other industries affected sentiment generally and partly accounted for the lower prices of engineering shares.

There were again only moderate movements among foreign rails, but elsewhere, Canadian Pacific were good, helped by the chairman's annual statement and by the better trend of Wall Street markets which have reflected hopes that the American business recession has been checked. Canadian Pacifics were \$49½, compared with \$46½ a week ago, while White Pass also improved from \$14 to \$14½.

Little business passed in Antofagasta stocks, the ordinary at 17½ and the preference at 34½ being virtually the same as a week ago. In other directions, Chilean Northern first debentures were dealt in at around 28½, while there has been business around 72½ in Costa Rica first debentures and at 17 in the ordinary stock. Brazil Railway bonds marked 5½. Mexican Central "A" bearer debentures were 66. United of Havana second income stock was 6½, while elsewhere, San Paulo Railway 3s. shares receded from 2s. 4½d. to 2s. after the statement by Mr. W. B. Common at the annual meeting on the delay in the award in the company's non-railway lands claim. Mr. Common said that it looked as if political considerations were playing a part in the delay. He added he could see no course open but to maintain unceasing pressure for their rights. He also stated that once the tax settlement had been reached, it looked as if it should be possible to make a further return to shareholders of not less than 1s. per share.

Nyasaland Railways shares were a good feature rising from 9s. 6d. to 11s. 6d. following the increase in the dividend from 5 per cent to 6 per cent, which came as a pleasant surprise. The 3½ per cent debentures changed hands at 60.

Among shares of locomotive builders and engineers further buying of G. D. Peters under the influence of the recent results and chairman's annual statement was a feature; they changed hands up to 33s. 3d. compared with 32s. 9d. a week ago. Elsewhere, North British Locomotive were 12s. 9d. compared with 13s. a week ago, and Birmingham Wagon eased from 16s. 10½d. to 16s. 6d., but elsewhere, the good yield again drew attention to Beyer Peacock 5s. shares which have risen to 8s. 7½d. compared with 8s. 4½d. a week ago. Charles Roberts 5s. shares were again 8s. and Westinghouse Brake have been maintained at 38s. Wagon Repairs 5s. shares were

better at 11s. 7½d. and also Gloucester Wagon 10s. shares at 15s. but elsewhere, Pressed Steel 5s. shares came back from 15s. 9d. to 15s. 3d.

Vickers, although lower on balance at 30s. 9d. became firmer following the publication of the report and annual review which drew renewed attention to the diversified activities of the group. In other directions, Associated Electrical reacted from 49s. 3d. to 48s. 6d., English Electric at 53s. 9d. became easier with the general trend in markets, as did General Electric at 30s. 9d.

F. Perkins 10s. shares receded from 10s. 7½d. to 9s. 7½d. on the decision not to pay a dividend for the past year, but the chairman considers the set-back to be temporary and expects a reasonable turn-over and profit in the current year. Guest Keen at 53s. 6d. remained under the influence of the higher distribution. The 10s. shares of the Dowty Group eased from 34s. 3d. to 33s. 6d. and Tube Investments came back to 51s. 7½d. British Timken were 48s. 9d., British Oxygen 32s. 6d. and British Aluminium 38s.

OFFICIAL NOTICES

ENGINEER required with Automobile suspension experience. Duties will include design, development and contact with customers.—Apply in writing stating age, training, experience and salary range, to Andre Rubber Co. Ltd., Kingston By-Pass, Surbiton, Surrey.

REQUIRED for British Railways, Western Region, **MECHANICAL INSPECTOR (DIESEL)** to Running & Maintenance Officer. Must be mechanically trained and have sound knowledge of Diesel Engines suitable for railway traction. Salary range, £848/882 per annum. Contributory Pension Scheme. Generous travelling facilities and annual leave after qualifying period.—Applications, stating qualifications, experience and age, should be made to the Running & Maintenance Officer, British Railways (Western Region), Paddington Station, London, W.2, not later than 31st May, 1958.

REQUIRED for the Southern Railway of Peru Limited, **CARRIAGE AND WAGON SUPERINTENDENT**. Must have served a general Engineering Apprenticeship, preferably in a Railway Workshop and have attained at least the Ordinary National Standard of Technical Education in Mechanical Engineering. Should also have no less than five years' experience in a supervisory capacity directing and handling men. Age 28/35. Ability to speak Spanish would be a great advantage. Salary, £1,350 per annum.—Apply in writing to Peruvian Transport Purchasing Co. Ltd., Rex House, 38 King William Street, London, E.C.4.

LONDON TRANSPORT require **TECHNICAL ASSISTANTS** for department of Chief Mechanical Engineer (Railways). Applicants should be between ages of 21 and 28 and have an interest in electric traction from the technical aspect. Degree or Higher National Certificate (Mechanical or Electrical Engineering) but consideration given to applicants holding Ordinary National Certificate and continuing their studies. Salary range, £425 at age 20 rising to £745 according to age, qualifications, and experience. Additional payments for certain recognised qualifications. Contributory superannuation scheme after probation. Medical examination; free travel.—Applications within 7 days to Staff and Welfare Officer (F/EV 687), London Transport, 55 Broadway, S.W.1.

THE NIGERIAN RAILWAY CORPORATION invites applications for the following post:—**DISTRICT ENGINEER.** Duties: The officer will be required to direct and supervise the maintenance of way and works and the construction of new works or renewals on a district of the Railway. Qualifications: Candidates must be Corporate Members of the Institution of Civil Engineers and have at least ten years' experience of maintenance of railway permanent way and works. Salary: £2,350 per annum. Appointments may be on pensionable terms or on contract with a gratuity payable on completion of contract at the rate of £39 3s. 4d. for each completed month of service. Tours: 15 months in Nigeria followed by 15 weeks' leave on full pay. Quarters: Partly furnished quarters are provided at low rental. Allowances: There are attractive family, travelling, transport and other allowances. Send postcard before 30th May, 1958, mentioning the post and this paper for further particulars and application form to:—The London Representative, Nigerian Railway Corporation, Nigeria House, 9, Northumberland Avenue, London, W.C.2.

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